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DEACTIVATION, DECOMMISSIONING, AND DISMANTLEMENT OF THE CPP-603 BASIN PROJECT

DRAFT ENVIRONMENTAL ASSESSMENT

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HELPFUL INFORMATION FOR THE READER

Scientific Notation

Scientists use scientific notation to express numbers that are very small or very large. This Environmental Assessment expresses a very small number with a negative exponent, such as $1.3x10^{-6}$. To convert this number to the expanded form, move the decimal point left by the number of places equal to the exponent, in this case 6. The number thus becomes 0.0000013. For large numbers, those with a positive exponent, move the decimal point to the right by the number of places equal to the exponent. This Environmental Assessment writes the number 1,000,000 as $1.0x10^{6}$. This document uses English units with conversion to metric units provided below.

Units

cm	centimeter(s)	m^2	square meter(s)
Ci	curie	m^3	cubic meter(s)
ft	foot (feet)	mi^2	square mile(s)
ft^2	square foot (feet)	mrem	millrem(s) (1/1000th of a rem)
ft^3	cubic foot (feet)	pCi	picocuries (10^{-12})
in.	inch(es)	rem	roentgen equivalent man (measure of radiation exposure)
km	kilometer(s)	r	roentgen
km^2	square kilometer(s)		
m	meter(s)		

Conversions

Metric to English

To Convert	Multiply By	To Obtain
cubic meters	3.531×10^{1}	cubic feet
cubic meters	1.308	cubic yards
liters	2.64×10^{-1}	gallons
kilograms	2.205	pounds
kilometers	6.214×10^{-1}	miles
meters	3.28084	feet
meters	1.093613	yards
square km	3.861×10^{-1}	square miles
square meters	1.196	square yards
kilograms	1.1×10^{-3}	tons

English to Metric

To Convert	Multiply By	To Obtain
cubic feet	2.8×10^{-2}	cubic meters
cubic yards	7.646×10^{-1}	cubic meters
gallons	3.785	liters
pounds	4.54×10^{-1}	kilograms
miles	1.609334	kilometers
feet	3.048×10^{-1}	meters
yards	9.144×10^{-1}	meters
square miles	2.590	square km
square yards	8.361×10^{-1}	square meters
tons	9.07185×10^{2}	kilograms

Units of Radioactivity, Radiation Exposure, and Dose

The basic unit of radioactivity used in this environmental assessment is the curie (Ci). The curie, based on one gram of the radionuclide Radium-226, decays at the rate of 37 billion disintegrations per second. For any other radionuclide, one curie is the amount of that radionuclide that decays at this rate.

Radiation exposure is expressed as roentgen (R), the amount of ionization produced by gamma radiation in air. Dose or units of "roentgen equivalent man" (rem) measure the effect of radiation on tissues.

Source of Radiation

Sources of ionizing radiation expose every person living in the United States and the world to radiant energy as ions pass through cells. Three general types of radiation sources are those of natural origin unaffected by human activities, those of natural origin but enhanced by human activities, and those produced by human activities.

The first group includes terrestrial radiation from natural radiation sources in the ground, cosmic radiation from outer space, and radiation from radionuclides naturally present in the body. Exposures to natural sources may vary depending on the geographical location and even the altitude at which a person resides. When such exposures are much higher than the average, they are considered elevated.

The second group includes a variety of natural sources. Human actions increase the radiation from these sources. For example, radon exposures in a given home may be elevated because of natural radionuclides in the soil and rock upon which the house is built. However, characteristics of the home, such as extensive insulation may enhance radon exposures of occupants. Another example is the increased exposure to cosmic radiation that airplane passengers receive when traveling at high altitudes.

The third group includes a variety of exposures from materials and devices such as medical x-rays, **radiopharmaceuticals{**XE "**Radiopharmaceuticals**. A radioactive compound used in radiotherapy or diagnosis"**}** (see Glossary) used to diagnose and treat disease, and consumer products containing minute quantities of radioactive materials. Exposures may also result from radioactive fallout from nuclear weapons testing, accidents at nuclear power plants, and other episodic events caused by human activity in the nuclear industry. Exposure also occurs from working in proximity to nuclear material and waste. Except for major nuclear accidents, such as the one that occurred at Chernobyl, exposure of workers and members of the public from activities at nuclear industries is very small compared with exposures from natural sources.[a]

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a. Paraphrased from National Council on Radiation Protection and Measurements, *Ionizing Radiation Exposure of the Populations of the United States*, National Council on Radiation Protection Report No. 93, September 1, 1987, p. 1.

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ACRONYMS AND ABBREVIATIONS

AACC	Acceptable Ambient Concentrations for Carcinogens
ACHP	Advisory Council on Historic Preservation
ANL-W	Argonne National Laboratory West
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulation
COPC	contaminant of potential concern
D&D	decontamination and dismantlement
DEQ	Department of Environmental Quality
DOE	U. S. Department of Energy
DOE-ID	DOE Idaho Operations Office
EA	environmental assessment
EIS	environmental impact statement
EPA	Environmental Protection Agency
FECF	Fuel Element Cutting Facility
FONSI	finding of no significant impact
FR	Federal Register
FRSF	Fuel Receiving and Storage Facility
HEPA	high-efficiency particulate air (as in HEPA filter)
HWMA	Hazardous Waste Management Act
IDAPA	Idaho Administrative Procedures Act
IFSF	Irradiated Fuel Storage Facility
INEEL	Idaho National Engineering and Environmental Laboratory
MCL	maximum contaminant levels
MEI	maximally exposed individual
MOA	Memorandum of Agreement
NCI	National Cancer Institute
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NRCP	National Council on Radiation Protection
NWCF-ETS	New Waste Calciner Facility-Evaporator Tank System
PEWE	Process Equipment Waste Evaporator
RCRA	Resource Conservation and Recovery Act
ROD	record of decision
S&M	surveillance and maintenance
SHPO	State Historic Preservation Office
SNF & INEL FEIS	Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement
SNF	spent nuclear fuel
SWPPP-CA	Storm Water Pollution Prevention Plan for Construction Activities
SWPPP-IA	Storm Water Pollution Prevention Plan for Industrial Activities
T&E	threatened and endangered (threatened and endangered species)
USFWS	U.S. Fish and Wildlife Service
VCO	voluntary consent order

1. INTRODUCTION

1.1 Purpose and Need

A primary **spent nuclear fuel**{XE "**Spent Nuclear Fuel**. Fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated. For the purposes of this EIS, spent nuclear fuel also includes uranium/neptunium target materials, blanket subassemblies, pieces of fuel, and debris."} (SNF{ TA \l "SNF###spent nuclear fuel" \s "SNF" \c 8 }) receipt and storage facility (CPP-603A) located at the Department of Energy's (DOE's{ TA \l "DOE###U. S. Department of Energy" \s "DOE" \c 8 }) Idaho National Engineering and Environmental Laboratory (INEEL{ TA \l "INEEL###Idaho National Engineering and Environmental Laboratory" \s "INEEL" \c 8 }) is no longer used for its intended purpose. All SNF within CPP-603A has been removed from the facility's underwater storage pools and placed in newer underwater and dry storage facilities on the INEEL. Because of this, the processes associated with treating and managing the water used to shield the SNF within CPP-603A are no longer necessary. The CPP-603A storage pools and associated water treatment processes are no longer needed, but they must either be maintained so they do not present a threat to public or worker health and safety, or isolated from the environment. DOE needs to eliminate the risk and costs associated with maintaining this facility and its associated processes because both risk and cost will increase as the facility ages. Therefore, DOE is exploring alternatives to reduce or eliminate the risks associated with maintaining this facility.

The proposed action and the alternatives include elements that constitute the **decommissioning**{XE "**Decommissioning**. The process of removing a facility from operation (deactivation), followed by decontamination, entombment, dismantlement, or conversion to another use."} of structures and components that may be considered major SNF storage facilities. Under DOE's NEPA Implementing Procedures, actions of this type normally require the preparation of an **environmental impact statement**{XE "**Environmental Impact Statement**. A detailed environmental analysis ofor a proposed major Federal action that could significantly affect the qualityof the human environment. A tool to assist in decisionmaking, it describes the positive and negative environmental effects of the proposed action and alternatives."} (EIS{ TA \l "EIS###environmental impact statement" \s "EIS" \c 8 }).[a] Nevertheless, risk analyses and modeling indicate isolating the contaminants contained in the CPP-603A basins and closing the associated waste tanks and water treatment system would result in little or no cumulative risk or impact to health or the environment. As a result, the DOE Idaho Operations Office (DOE-ID{ TA \l "DOE-ID###DOE Idaho Operations Office" \s "DOE-ID" \c 8 }) has prepared this Draft **Environmental Assessment**{XE "**Environmental Assessment**. A concise public document that a Federal agency prepares under the NEPA to provide sufficient evidence and analysis to determine whether a proposed agency action would require preparation of an EIS or a FONSI. A Federal agency may also prepare an EA to aid its compliance with NEPA when no EIS is necessary or to facilitate preparation of an EIS when one is necessary. An EA must include brief discussions of the need for the proposal, alternatives, environmental impacts of the proposed actions and alternatives, and a list of agencies and persons consulted."} **(EA**{ TA \l "EA###environmental assessment" \s "EA" \c 8 }) to analyze the potential environmental impacts of a proposed action and **alternatives**{XE "**Alternatives**. The range of reasonalbe options, including the No Action alternative, considered in selecting an approach to meeting the proposed objectives."} to address the stated purpose and need. Following consideration of public comments, DOE will determine whether a **finding of no significant impact**{XE "**Finding of No Significant Impact**. A document, based on an EA by a federal agency briefly presenting the reasons why an action will not have

a. Elements of the proposed deactivation projects are addressed in the DOE NEPA Implementing Procedures at 10 CFR 1201, Appendix D to Subpart D, "Classes of Actions that Normally Require Environmental Impact Statements (EISs)" Subsection D10; "*Siting/construction/operation/decommissioning of major treatment, storage, and disposal facilities for high-level waste and spent nuclear fuel.*"

a significant effect on the human environment and for which an EIS will therefore not be prepared."} (FONSI{ TA \l "FONSI###finding of no significant impact" \s "FONSI" \c 8 }) is appropriate or that an EIS is required.

1.2 Background

An essential element of DOE decisionmaking is a thorough understanding of the environmental impacts that may occur during the implementation of an action or actions that have the potential to cause environmental impacts. The **National Environmental Policy Act**{XE "**National Environmental Policy Act**. A Federal law, enacted in 1970, that requires the Federal government to consider the environmental impacts of, and alternatives to, major proposed actions in its decisionmaking processes. Commonly referred to by its acronym, NEPA."} (NEPA{ TA \l "NEPA###National Environmental Policy Act" \s "NEPA" \c 8 }) of 1969, as amended, provides federal agency decisionmakers with a process, and a mandate, to consider the potential environmental consequences of proposed actions and alternatives before decisions are made. In following this process, DOE has prepared this draft EA.

The DOE Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement (SNF & INEL FEIS{ TA \l "SNF & INEL FEIS###Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement" \s "SNF & INEL FEIS" \c 8 }) **Record of Decision**{XE "**Record of Decision**. A public document that records the final decision(s) concerning a proposed action. The Record of Decision is based in whole or in part on information and technical analysis generated either during the Comprehensive Environmental Response, Compensation, and Liability Act) process or the NEPA process, both of which take into consideration public comments and community concerns. "} (ROD{ TA \l "ROD###record of decision" \s "ROD" \c 8 }) also addresses the proposed action (DOE 1995a{ TA \l "DOE (U. S. Department of Energy), 1995a, *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs EIS*, U. S. Department of Energy, Office of Environmental Management, Idaho Operations Office, April 1995." \s "DOE 1995a" \c 9 }, DOE 1995b{ TA \l "DOE (U. S. Department of Energy), 1995b, *Record of Decision, Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs EIS*, U. S. Department of Energy, Office of Environmental Management, Idaho Operations Office, May1995." \s "DOE 1995b" \c 9 }). The SNF & INEL FEIS considers programmatic (DOE-wide) alternative approaches to managing existing and projected quantities of SNF until the year 2035, and addresses alternative approaches for management of DOE's environmental restoration, waste management, and SNF activities over the next 10 years at the INEEL. The ROD selected the "Modified Ten-Year Plan Alternative" for implementation at the INEEL. As part of the decision, DOE determined that certain projects evaluated in the SNF & INEL FEIS would go forward, while deferring other actions. For the proposed deactivation of CPP-603A, the ROD states; "*Implementation decisions would be made in the future pending further project definition, funding priorities, and any further review under the* **Comprehensive Environmental Response, Compensation, and Liability Act**{XE "**Comprehensive Environmental Response, Compensation, and Liability Act**. CERLCA provides funding and enforcement authority for cleaning up hazardous waste sites created in the past and for responding to hazardous substance spills. "} or NEPA." DOE has transferred the spent fuel stored under water in CPP-603A to newer storage facilities at the INTEC. DOE monitors CPP-603A to ensure contamination in the facility is contained and public and worker safety are maintained (DOE 1995a{ TA \s "DOE 1995a" }).

1.2.1 Facility Description

DOE considers the CPP-603A facility obsolete (in some cases deteriorating), and therefore, has not designated it for any alternative future use. See Section 2 for a detailed description of the proposed action and alternative actions for this facility.

The CPP-603 building is comprised of two primary SNF facilities (see Figure 1) including the CPP-603A, Fuel Receiving and Storage Facility (FRSF{ TA \l "FRSF###Fuel Receiving and Storage Facility" \s "FRSF" \c 8 }) and CPP-603B, the Irradiated Fuel Storage Facility (IFSF{ TA \l " IFSF ###Irradiated Fuel Storage Facility" \s "IFSF" \c 8 }). The FRSF contains three underwater fuel storage basins and a fuel element cutting cell. CPP-603A was used to receive, unload, and provide underwater storage for fuel. The Fuel Element Cutting Facility (FECF{ TA \l "FECF###Fuel Element Cutting Facility " \s "FECF" \c 8 }) is in the FRSF portion of the building and was previously used for cutting fuel. In CPP-603B, the IFSF provides handling and dry storage for graphite-based fuel and other spent fuels.

There are four other buildings associated with CPP-603 (see Figure 1): CPP-626, CPP-648, CPP-1677, and CPP-764. CPP-626 contains offices, lunchroom, and a change room. CPP-764 is an underground vault that houses the storage vessel VES-SFE-126 (Liquid Waste Collection Tank) and its associated valves. CPP-1677 is a relatively new abovegrade building associated with VES-SFE-126. CPP-648 is associated with the underground tank vault containing VES-SFE-106, the Radioactive Solids and Liquid Waste Storage Vessel.

CPP-603B includes the IFSF and the East-West Truck Bay. The IFSF would remain in service and would continue to be used for handling and dry storage of graphite-based fuel and other fuels. In addition, buildings CPP-626, CPP-1677, CPP-764, and VES-SFE-126 would remain in service to support the IFSF operation (see Figure 2).

DOE began construction of CPP-603 in the early 1950s and the underwater storage basins began operation in 1953. The basins have been used to store SNF since they were placed in service. The facility was constructed to **seismic**{XE "**Seismic**. Of, subject to, or caused by an earthquake or earth vibration."} criteria, construction codes, and safety requirements of the early 1950s. In addition, the basins, constructed of reinforced concrete, have no liners or leak-detection system. Because safety requirements have changed since the early 1950s and the facility has aged, DOE could not continue to safely store SNF in the basins. Therefore, in accordance with a federal court order, DOE removed the last SNF from the CPP-603A basins in April 2000.

Three carbon steel boxes remain in the basins, at least two of which contain miscellaneous activated metal objects leftover from fuel handling operations. In addition, about 130,000 Kg of sludge remain in the bottom of the basins. The total amount of solids calculated were: 83424.16 Kg (2033 ft^3) for the North Basin, Middle Basin and Transfer Channel zone, and 23061.67 Kg (562 ft^3) each for the South Basin; for a total of 129547.5 Kg in the basins at CPP-603A. The formula "N ft^3 x 28.3 l/ ft^3 x 1.45 Kg/l" was used to calculate the mass of solids. Shielding the sludge and steel boxes is 1,500,000 gal of water. The three interconnected basins included support processes to treat and maintain the basin water quality, including filtration, ion exchange, chloride removal, reverse osmosis demineralization, and ultraviolet light sterilization.

DOE, with the removal of the SNF, is now ready to move forward with deactivation of CPP-603A.

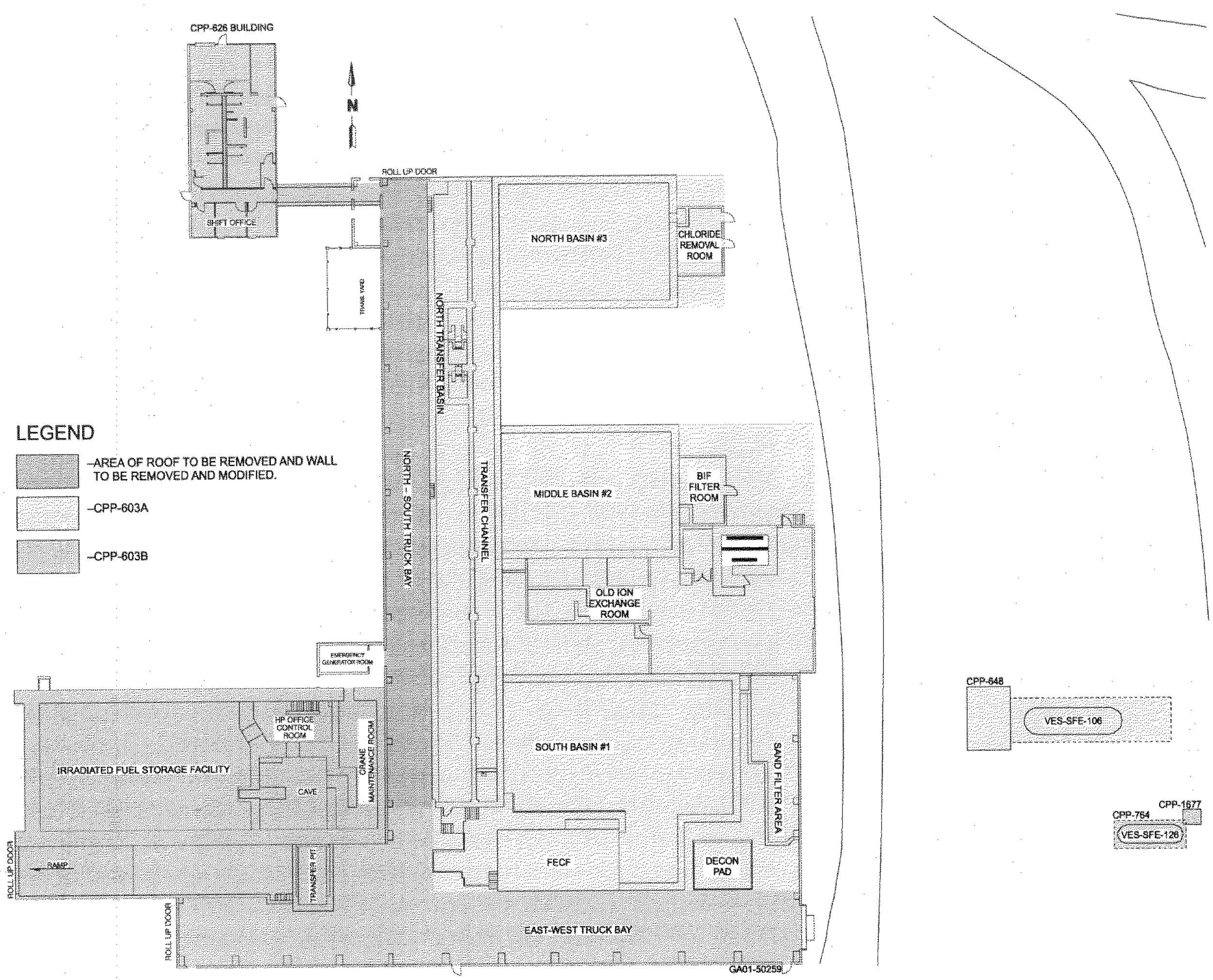

Figure 1. Planview of CPP-603.

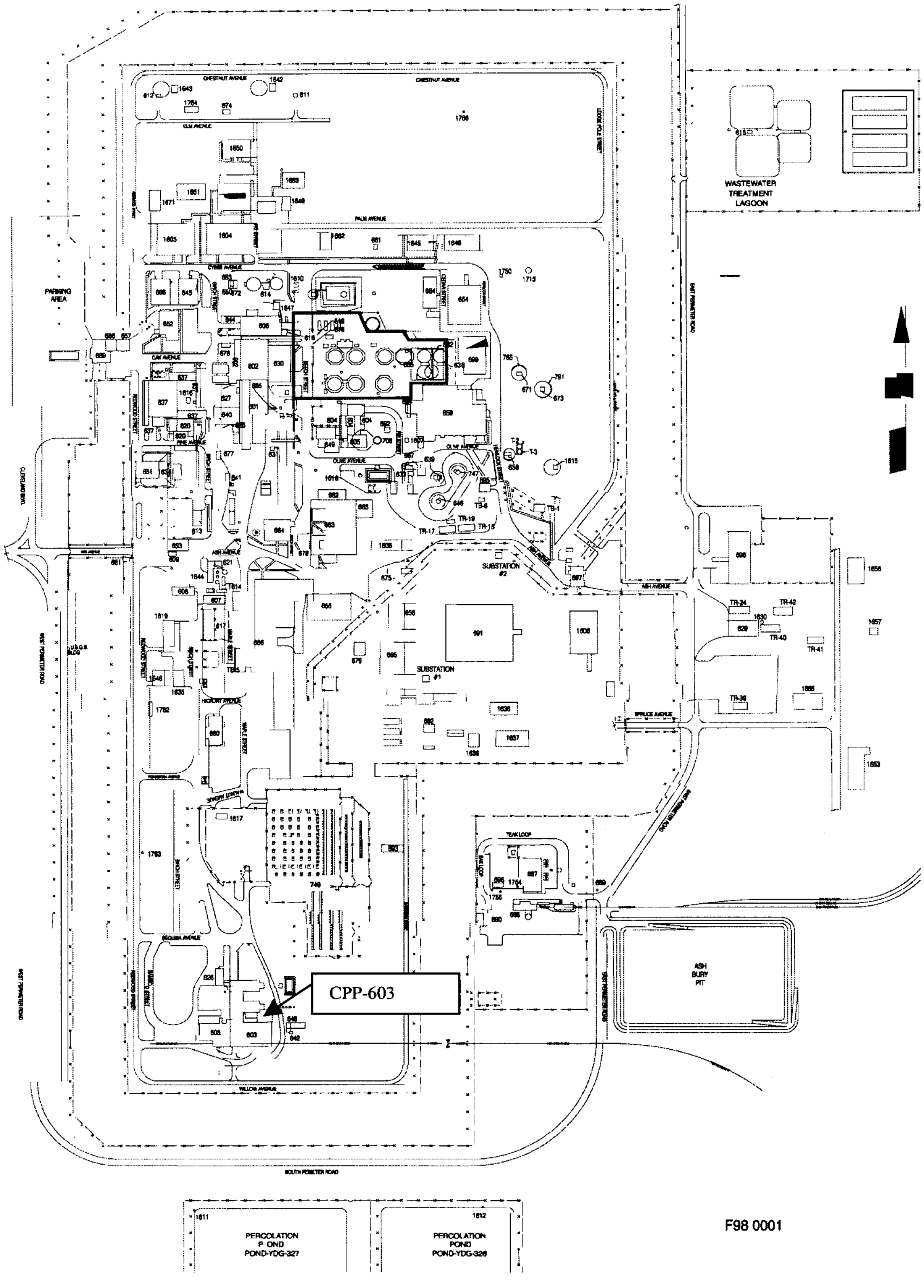

Figure 2. Planview of the Idaho Nuclear Technology and Engineering Complex.

2. DESCRIPTION OF ALTERNATIVES

The proposed action described in Section 2.1 below is to accomplish short-term objectives such as sludge removal and stabilization of CPP-603A. The proposed action would allow time to clearly define long-term objectives such as the final end-state of INTEC. Examples of long-term actions include determining how much of the facility should be removed, if any, and what the facility end-state should be for compatibility with CPP-603B (the IFSF) that currently stores SNF and the end-state of INTEC. The time would also allow DOE to complete a **composite analysis**{XE " **Composite Analysis.** An analysis that accounts for all sources of radioactive material that may contribute to the long-term dose projected to a hypothetical member of the public from an active or planned low-level waste disposal facility. The analysis is a planning tool intended to provide a reasonable expectation that current low-level waste disposal activities will not result in the need for future corrective or remedial actions to ensure protection of the public and the environment. (Adapted from Revised Interim DOE Policy on Management Direction and Oversight of Low-Level Radioactive Waste Management Disposal).} for INTEC and time to evaluate currently available and new developing products to contain and control the radioactive contamination on the basin walls. For the purpose of this EA, the Proposed Action or interim stage is the period starting with deactivation and ending with a decision on the end-state for CPP-603B and INTEC and the evaluation of the contribution of risk from CPP-603A to the INTEC Composite Analysis. The Proposed action provides for near-term stabilization for CPP-603A, but it is premature to determine the final configuration for CPP-603B until DOE moves the SNF and completes the composite analysis for all of INTEC.

Section 2.2 provides a description of the three Facility Disposition Alternatives for the closure of CPP-603A. These include (1) Demolish and Partially Remove (Alternative 1), (2) Demolish and Grout In Place (Alternative 2), and (3) Deactivate and Remove (Alternative 3). Section 2.3 describes the No Action Alternative. In addition, Section 2.4 discusses the closure of the VES-SFE-106 **Hazardous Waste Management Act**{XE "**Hazardous Waste Management Act.** Idaho Hazardous Waste Management Act, IDAPA 16.01.05, *Rules and Standards for Hazardous Waste* are the rules adopted pursuant to the authority vested in the Board of Health and Welfare by the Hazardous Waste Management Act of 1983, Sections 39-4401 et seq., Idaho Code. Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities, IDAPA 16.01.005.009, incorporate by reference 40 CFR Part 265, and all Subparts (excluding Subpart R and 40 CFR Parts 265.149 and 265.150) revised as of July 1,1994. (4-26-95).} (HWMA{ TA \l "HWMA###Hazardous Waste Management Act" \s "HWMA" \c 8 })/Resource Conservation and Recovery Act (RCRA{ TA \l "RCRA###Resource Conservation and Recovery Act" \s "RCRA" \c 8 }) unit and the basin water treatment system components identified in the **Voluntary Consent Order**{XE " **Voluntary Consent Order.** The Voluntary Consent Order (VCO) was signed by DOE and the Idaho DEQ and became effective on June 14, 2000. The VCO covers several matters where the INEEL is potentially not in regulatory compliance with RCRA. For each covered matter, the issue description, action summary, and milestones have been discussed with the Idaho DEQ to identify an acceptable path forward to bring the matter into regulatory compliance.} (VCO{ TA \l "VCO###voluntary consent order" \s "VCO" \c 8 }) associated with CPP-603A. **Standard practices**{XE "**Standard Pratices**. Those actions that avoid impacts altogether, minimize impacts, rectify impacts reduce or eliminate impacts, or compensate for the impact. In this case they are actions that are incorporated into the project design to minimize or eliminate potential impacts."} used to reduce or limit risk and environmental impacts are discussed in Section 2.5.

The best approach for the final disposition of CPP-603A would be determined based on information gathered during the interim stage. The final disposition could be one of the scenarios presented in Section 2.2, or it could be a combination of components of the three alternatives. Therefore, Alternatives 1, 2, and 3 bound the potential impacts of the final disposition activities.

2.1 Proposed Action

The Proposed Action or interim stage action will (1) remove the sludge from the basins, (2) close the VES-SFE-106 tank system, and (3) control spread of radioactive contamination from the basins walls.

Over time, approximately 130,000 Kg of sludge has accumulated on the bottom of the basins. The sludge is comprised of desert sand, dust, precipitated corrosion products, and metal particles from past fuel rod cutting operations. The treatment option under consideration would remove, solidify (or otherwise treat), and dispose of about 90% of contaminated sludge at an appropriate facility. This treatment scenario would initially remove water via a hydrocyclone unit. The next step would move, the now partially de-watered solids, into casks where more water would be removed by adding flocculent to settle the solids out of suspension. The final step would add cement (or a similar material) and mix it with the suspension to solidify the sludge to render it non-hazardous for characteristic toxic metals. DOE also proposes to deactivate the CPP-648 Sludge Tank Control House building and the CPP-648 Valve Pit, and close the VES-SFE-106 (Radioactive Solids and Liquid Waste Storage Vessel) Tank System to a risk based closure performance standard under **interim status,**{XE "**Interim Status.** RCRA interim status facility Hazardous waste management facilities (that is, treatment, storage, or disposal facilities) subject to Resource Conservation and Recovery Act requirements that were in existence on the effective date of RCRA regulations are considered to have been issued a permit on an interim basis as long as they have met notification and permit application submission requirements. Such facilities are required to meet interim status standards until they have been issued a final permit or until their interim status is withdrawn."} in accordance with HWMA/RCRA requirements and manage the basin water treatment units in compliance with the VCO. Workers would maintain a relatively constant water level in the basins to control radioactive contamination on the sides of the basins until a decision on the final disposition of CPP-603A. Under the proposed action, the implementation of further decommissioning and deactivation activities, which may constitute the irreversible commitment of resources, would be dependent on the findings contained in a composite analysis completed in accordance with DOE Order 435.1.

2.2 Facility Disposition Alternatives

Criteria used to develop and compare the Facility Disposition Alternatives are: risk to worker, risk to environment, regulatory requirements and constraints, waste generation volume, and schedule. The approximate costs associated with each alternative are provided for information, including ongoing surveillance and maintenance (S&M{ TA \l “S&M###surveillance and maintenance" \s "S&M" \c 8 }) costs and water treatment costs. Table 1 provides a detailed description of each of the alternatives.

2.2.1 Deactivation Activities

Alternative 1 would demolish the facility and dispose of the superstructure in an appropriate disposal facility. All equipment and piping would be removed for reuse or disposed of in a landfill or Low-Level Waste disposal facility. The basins would be grouted in place as the water is removed by passive evaporation. Alternative 2 would demolish the facility and place the building superstructure, equipment, and piping in the basins and fill the basins with grout. In Alternative 3, the building superstructure and the basins would be demolished, removed, and disposed of at an appropriate disposal facility.

In Alternatives 1 and 3 the sludge at the bottom of the basins would be removed and disposed of at an appropriate disposal facility. The basin water would be transferred to an on-Site treatment facility in both Alternatives 2 and 3.

The end point of decontamination and dismantlement (D&D{ TA \l "D&D###decontamination and dismantlement" \s "D&D" \c 8 }) action of the facility differs between alternatives. Alternative 1 would result in a grout-filled basin 1-5 feet in height; Alternative 2 would result in a slightly higher mound between 5-10 feet in height; and Alternative 3 would result in a clean site, backfilled with clean soil.

The VES-SFE-106 (Radioactive Solids and Liquid Waste Storage Vessel) Tank System would be closed to a "risk based closure performance standard"[a] under Alternative 1. Under Alternative 2, the VES-SFE-106 Tank System would be closed in accordance with the closure and post-closure requirements that apply to landfills. Under Alternative 3, the VES-SFE-106 Tanks System would be closed to a "clean-closure" performance standard by removal.

The estimated cost of each alternative varies between $50M for Alternatives 1 and 2, and $200M for Alternative 3.

The duration for each alternative varies also. Using Alternative 1 as the baseline, Alternative 2 would not take as long because the 1.5M gal of water is transferred to the Process Equipment Waste Evaporator (PEWE{ TA \l "PEWE###Process Equipment Waste Evaporator " \s " PEWE " \c 8 }) rather than evaporated, but the actual demolition would take 2 to 3 years longer due to the complexity and additional handling required. Alternative 3 is similar to Alternative 2 for the water disposal, but significantly longer (~5 to 7 years). Alternative 1 fits the current funding profile (i.e., level funding for 8-yr evaporation) versus very high funding requirements to accelerate the actions described for Alternatives 2 and 3.

2.2.2 Post-Deactivation Activities

Post-deactivation activities for Alternatives 1 and 2 would include characterization of the structure and surrounding soils to develop the final **D&D report{**XE " **D&D Report**. This report formally documents an overview of project activities, accomplishments, final facility or site status, and lessons learned. Prerequisites include the D&D project cleanup and disposal activities, independent verification of the project final status, and waste disposal actions have been completed.**}**. The final D&D report formally documents the accomplishments and final status of the facility. The final D&D report will be reviewed to determine if the remediation goals and remedial action objectives under the Operable Unit 3-13 ROD have been met. Alternative 3 would result in a clean site and, therefore, no post-deactivation activities are anticipated.

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a EPA Guidance provided in a March 16, 1998 Memorandum on "Risk-Based Clean Closure", from Elizabeth Cotsworth, Acting Director/Office of Solid Waste to RCRA Senior Policy Advisors, Region I - X

Table 1. Facility Deactivation and Post Deactivation Alternatives and Basin Water Treatment Alternatives for the Closure of CPP-603A.

	Facility Deactivation and Post-Deactivation Alternatives		
Activity	**Alternative 1: Demolish and Partially Remove**	**Alternative 2: Demolish and Grout In Place**	**Alternative 3: Deactivate and Remove**
		Facility Disposition	
Deactivation	The North/South Truck Bay would be modified to accommodate the continued use of the CPP-603B portion of the facility.	Same as Alternative 1	Same as Alternative 1
	The sludge on the bottom of the basins would be removed, solidified, and sent to a waste facility or treated and disposed of at an appropriate disposal facility.	The sludge would not be removed under Alternative 2.	Same as Alternative 1
	Workers would not replenish water lost to natural evaporation and allow the basin water to evaporate from the basins. To control the spread of radioactive contamination deposited on the basin walls as the water level recedes, a relatively constant water level would be maintained by displacing the evaporated water with grout in the three basins, transfer canal, and transfer stations. The grout also provides radiological shielding for the activated metal objects that remain in the three carbon steel boxes. These metal objects include metal buckets, various tools, and fuel rod end pieces. As a result of exposure to highly irradiated SNF over many years, the metal objects have been activated. The activation products are comprised primarily of cobalt-60, which has a half-life of 5.27 years. The activation products will decay within about 10 half lives, well before the integrity of the grout is compromised.	Transfer the 1,500,000 gal of basin water and process it through the INTEC Tank Farm, NWCF-ETS, and/or the PEWE systems.	Same as Alternative 2
	All equipment and piping would be removed for reuse or demolished. The building roof, walls, and structural steel framing would be demolished, removed, and disposed of in an appropriate disposal facility. Radiological workers would survey process equipment and structural components in the above grade areas for radioactive and hazardous contamination. Workers would manage contaminated equipment or material appropriately based on its characterization. Following radiation surveys and hot-spot stabilization, construction workers would dismantle, treat, and/or dispose of the roof, walls, and superstructure. The roofing and walls consist of transite siding containing asbestos or precast pumice blocks. The asbestos materials in the roof and siding are intact. The INEEL would manage all waste streams based on the appropriate characterization.	Workers would demolish all aboveground equipment and structure materials. Place all waste in the CPP-603A basins and fill them with grout. This includes the Demineralizer and Regeneration Room (Old Ion Exchange Room), Basin Filter (Sand Filter) area, and New Ion Exchange area (see Figure 1). Process equipment and structural components in the abovegrade areas would be sized to take maximum advantage of available capacity in the basins. The same control measures as Alternative 1 would be implemented.	Same as Alternative 1

Table 1. Facility Deactivation and Post Deactivation Alternatives and Basin Water Treatment Alternatives for the Closure of CPP-603A.

	Facility Deactivation and Post-Deactivation Alternatives		
Activity	**Alternative 1: Demolish and Partially Remove**	**Alternative 2: Demolish and Grout In Place**	**Alternative 3: Deactivate and Remove**
Deactivation	The application of water or other dust suppressants during the dismantling and sizing steps would prevent radioactive or asbestos particles from becoming airborne.		
	The Demineralizer and Regeneration Room (Old Ion Exchange Room), Basin Filter (Sand Filter) area, and New Ion Exchange area, where basin water treatment system components identified in the VCO are located, would be demolished and disposed of. The FECF Hot Cell would also be demolished to the level of the top of the basins and disposed of at an appropriate low-level waste facility.	The FECF Hot Cell portion below the top of the basins would be grouted in place.	Workers would demolish and dispose of the FECF, the Demineralizer and Regeneration Room (Old Ion Exchange Room), Basin Filter (Sand Filter) area, New Ion Exchange area, the three basin structures, transfer canal, and transfer stations.
	At the end of D&D activities, CPP-603A would be a grout-filled basin contoured to prevent collection of precipitation. Characterization of the structure and surrounding soils would be conducted, which would be used to develop the final D&D report.	The basins would be filled with structural debris and waste that had been sized to take maximum advantage of available space, stabilized in grout, and contoured to prevent collection of precipitation. Any waste that would not fit in the basins would be stabilized in grout on top of the grouted basins.	The final end-state of CPP-603A would be a clean site back-filled with clean soil that would be contoured and revegetated to minimize erosion.
	Workers would deactivate the CPP-648, Sludge Tanks Control House building and CPP-648 Valve Pit, and close the VES-SFE-106 (Radioactive Solids and Liquid Waste Storage Vessel) Tank System to a risk based closure performance standard under **interim status** in accordance with HWMA/RCRA requirements and manage the basin water treatment units in compliance with the VCO.	Workers would deactivate the CPP-648, Sludge Tank Control House building, CPP-648 Valve Pit, and close the VES-SFE-106 Tank System in accordance with the closure and post-closure care requirements that apply to landfills in accordance with HWMA/RCRA and VCO requirements.	Workers would close the VES-SFE-106 Tank System to a "clean closure" performance standard by removal under interim status in accordance with HWMA/RCRA and VCO requirements. Buildings, CPP-626, CPP-1677, and CPP-764 would remain in service (CPP-603B)
	Workers would place CPP-603A into a condition that would not prohibit future stabilization of CPP-603B and INTEC as a whole. DOE would close the Radioactive Solids and Liquid Waste Storage Vessel, VES-SFE-106 Tank System in accordance with an approved HWMA/RCRA closure plan and VCO requirements.	Same as Alternative 1	Same as Alternative 1
Post-Deactivation	Following the D&D activities, the D&D Program will conduct an adequate characterization of the facility structure and surrounding soils. This characterization will be used to develop the final D&D Report.	Same as Alternative 1	No post-deactivation activities are expected. This alternative would result in a clean site, since workers would remove all contamination and dispose of it elsewhere.

Table 1. Facility Deactivation and Post Deactivation Alternatives and Basin Water Treatment Alternatives for the Closure of CPP-603A.

	Facility Deactivation and Post-Deactivation Alternatives		
Activity	**Alternative 1: Demolish and Partially Remove**	**Alternative 2: Demolish and Grout In Place**	**Alternative 3: Deactivate and Remove**
		Basin Water Treatment	
	Evaporate Passively – As the 1,500,000 gal of basin water evaporates, INEEL workers would replace it with grout. The grout would control the spread of radioactive contamination from residues on the sides and bottom of the basins by maintaining a relatively constant water level in the basins. The passive evaporation option would take approximately eight years, support the current funding profile, cost about $317K, and would not require permits.	INTEC Tank Farm, NWCF-ETS, and PEWE – It would be necessary to dispose of the basin water relatively quick under this alternative in order to provide capacity for the demolition waste. The basin water would be transferred to the INTEC NWCF-ETS/PEWE under this alternative to achieve this goal. Since the INTEC Tank Farm, NWCF-ETS, and the PEWE systems are tied together, eventually evaporator bottoms would be generated if either evaporation system were used to process the basin water. When bottoms are mixed with existing wastes in the Tank Farm, the INEEL could generate a waste stream that would add to existing tank farm wastes.	Same as Alternative 2
		Costs[a]	
Cost	This alternative would cost approximately $50M.	This alternative would cost approximately $50M.	DOE estimates that this alternative would cost $200M. In addition to the $200M, DOE would incur additional annual surveillance and maintenance costs since this alternative would take longer to complete.

a. Cost includes both the facility disposition and water treatment.

2.3 Basin Water Treatment Alternatives

All of the alternatives, with the exception of the No Action alternative would require the removal of 1,500,000 gal of basin water. DOE has evaluated the following options to remove and treat the basin water.

- Send the water to the INTEC Tank Farm, followed by evaporation in the New Waste Calciner Facility-Evaporator Tank System (NWCF-ETS{ TA \l "NWCF-ETS###New Waste Calciner Facility-Evaporator Tank System" \s "NWCF-ETS" \c 8 })
- Send the water to the PEWE
- Send the water to an off-site facility capable of treating and disposing the water such as the Savannah River Site
- Send the water to the INEEL Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA{ TA \l "CERCLA###Comprehensive Environmental Response, Compensation, and Liability Act" \s "CERCLA" \c 8 }) Disposal Facility
- Allow the water to evaporate passively from the basins.

The INTEC Tank Farm is an existing RCRA, interim status, Storage Facility used to store liquid waste. The NWCF-ETS and PEWE are existing RCRA interim status facilities at INTEC that treat liquid waste by evaporation. Other facilities considered include the INEEL CERCLA Disposal Facility scheduled to be operational by 2003, the small batch evaporators at Argonne National Laboratory-West (ANL-W{ TA \l "ANL-W###Argonne National Laboratory West " \s " ANL-W " \c 8 }), and other existing off-Site treatment facilities such as those available at Savannah River. The passive evaporation option would simply halt the addition of make-up water to the basins and allow the basin water to evaporate passively to the atmosphere over time.

Alternative 1 would treat basin water by passive evaporation while filling the basins with grout. Alternatives 2 and 3 would transfer the basin water to an on-site treatment facility (see Table 1).

Several other treatment options were considered for the 1,500,000 gal of basin water, however, DOE has found these treatment options nonviable. Examples of why these options are considered nonviable include the following. Off-Site treatment, like Savannah River, would cost about $97M, shipping the basin water to ANL-W for treatment would cost about $4.2M, or obtaining a subcontractor (on-Site) to treat the basin water would cost about $4M. The approximately 100 to 150 shipments required to transport the water to a treatment facility could potentially result in human health and environmental impacts. The ANL-W treatment option would evaporate the 1,500,000 gal of water at a very slow rate, almost the same as the passive evaporation option. A portable water treatment system brought on-Site by a subcontractor to treat the water would generate 1,500,000 gal of treated water that potentially could not be disposed of at the INEEL. This is because current DOE orders do not describe minimum treatment criteria. Transporting the basin water to the CERCLA disposal facility would require construction of a pipeline that would cost approximately $2M, though only CERCLA-generated waste could be accepted. Therefore, the CERCLA disposal facility cannot be used to dispose of the waste because the activity would have to be conducted under CERCLA authority.

2.4 No Action Alternatives

This EA describes two "No Action" alternatives: (1) Continue the activity without modification (*Continue*) and (2) Discontinue the ongoing activity (*Discontinue*).

The *Continue*[a] No Action alternative gives a baseline from which to assess beneficial and detrimental effects associated with changes to the current activity resulting from the action alternatives. Likewise, the *Discontinue* No Action alternative highlights the purpose of, need for, and the beneficial and detrimental effects of the ongoing activity (McCold and Saulsbury 1998{ TA \l "McCold L. N. and J. W. Saulsbury, 1998, *Defining the No-Action Alternative for National Environmental Policy Act Analyses of Continuing Actions, Environmental Impact Assessment*, Vol. 18, pages 15-37." \s "McCold and Saulsbury 1998" \c 9 }).

The INEEL Land Use Plan (DOE 1996a{ TA \l "DOE (U. S. Department of Energy), 1996a, INEL Comprehensive Facility and Land Use Plan, Idaho Falls, DOE/ID-10514, March 1996." \s "DOE 1996a" \c 9 }) indicates that the INTEC would remain an industrial corridor with no public access after 2095. This EA assumes that beyond 2095, public access to the INTEC would continue to be restricted.

2.4.1 Continue Facility Maintenance Operations

Under this alternative of No Action, DOE would continue maintenance activities at CPP-603A. The INEEL discontinued fuel storage in the CPP-603 basins in compliance with the **Idaho Settlement Agreement**.{XE " **Idaho Settlement Agreement**. In October 1995, the State of Idaho, the Department of the Navy, and DOE settled the cases of Public Service Co. of Colorado v. Batt, No. CV-91-0035-S-EJL

a. For proposed changes to an ongoing activity, "no action" can mean continuing with the present course of action with no changes. It can also mean discontinuing the present course of action by phasing-out operations in the near future (see McCold and Saulsbury 1998{ TA \s "McCold and Saulsbury 1998" }).

(D. Id.) and United States v. Batt, No. CV-91-0054-S-EJL (D. Id.). Under the Idaho Settlement Agreement, DOE is obligated to meet certain milestones involving the management and disposition of SNF and wastes at the INEEL).} The INEEL has not designated a future use for the facility. However, fuel storage activities have left process equipment, vessels and piping contaminated with highly radioactive process residues. To assure the continued containment of highly radioactive process residues and control radiological contamination found in these facilities, S&M would continue at an estimated $1-2M annually. These costs are necessary to (1) contain and prevent the spread of contamination, (2) repair equipment and leaking, broken, and malfunctioning lines, (3) maintain the superstructure, and (4) keep monitoring equipment in working order. In addition, DOE would continue providing utilities (electricity, heat, water, etc.) to the facilities.

2.4.2 Discontinue Facility Maintenance

Under this alternative of No Action, DOE would not deactivate or decontaminate any of the facilities. In addition, DOE would discontinue annual S&M activities.

2.5 Compliance with Resource Conservation and Recovery Act and the VCO Closure Activities

RCRA requires units that are no longer actively managing hazardous waste to undergo closure. CPP-603A includes an HWMA/RCRA interim status unit consisting of a 25,000-gallon tank (VES-SFE-106) used for waste storage and treatment. It is assumed for purposes of analysis in this document that the units identified in the VCO would be considered part of the HWMA/RCRA Tanks System and could be closed to the same closure performance standard as the HWMA/RCRA interim status unit. However, there is a possibility that scheduling and budgetary constraints could cause the VCO and interim status units to be closed at different times. Should this occur, the VES-SFE-106 unit and its ancillary equipment would be closed under a HWMA/RCRA Closure Plan approved by the Idaho Department of Environmental Quality (DEQ{ TA \l "DEQ###Department of Environmental Quality" \s " DEQ" \c 8 }). The VCO basin water treatment system components and their associated ancillary equipment would be closed under a separate HWMA/RCRA Closure Plan and on a schedule agreed upon by the parties under the VCO. A total of twelve tanks and associated ancillary equipment systems utilized for basin water treatment have been identified in the VCO and will require characterization and dispositioning. The VES-SFE-106 tank system began operation in 1972, and will be considered for RCRA closure upon completion of D&D activities that may contribute waste to this tank.

DOE would perform the HWMA/RCRA closure in accordance with an approved closure plan(s) and the requirements identified under the VCO. HWMA/RCRA closure of a tank system requires the removal or decontamination of all waste residues, structures, equipment, and soils contaminated with hazardous materials. The requirements of the VCO are expected to be similar, but would be negotiated on a case-by-case basis with the Idaho DEQ. If it is not practical to remove all waste or decontaminate all system components as required by RCRA, DOE would close the tank system in accordance with requirements applicable to landfills and perform post-closure care and monitoring of the system, or pursue risk-based closure per Environmental Protection Agency (EPA{ TA \l "EPA###Environmental Protection Agency" \s "EPA" \c 8 }) guidance. It is the intent of DOE to follow the regulations and attempt to attain "clean closure" through decontamination of the RCRA-regulated units.

DOE is preparing a RCRA closure plan to describe in detail how closure of the tank system would occur. The Idaho DEQ must review and approve the plan before initiation of closure activities.

Closure to Landfill Standards – If the VES-SFE-106 Tank System could not be closed in accordance with the HWMA/RCRA Closure Plan, or workers could not remove all contamination, then DOE would close this unit using closure and post-closure care requirements that apply to landfills. The INEEL would then place a RCRA cap [40 Code of Federal Regulations (CFR{ TA \l "CFR###Code of Federal Regulation" \s "CFR" \c 8}) 264.310(a)] over this unit upon completion of the building deactivation.

Implementation of the requirements imposed by a closure plan and the requirements of the VCO would ensure that the RCRA unit and water treatment system would not pose a future threat to human health or the environment after it is closed. DOE must close this RCRA unit in a manner that minimizes the need for care after closure. In addition, DOE must control, minimize, or eliminate the escape of hazardous waste, hazardous **leachate**{XE "**Leachate**. A product or solution formed by leaching, especially a solution containing contaminants picked up through the leaching of soil."}, or hazardous waste decomposition by-products; and meet the closure requirements for each type of unit. To accomplish this requirement, closure provides for the removal or decontamination of all waste residues, contaminated containment system components (liners, etc.), contaminated soils, and structures and equipment contaminated with waste, and the appropriate management of this waste. If the contaminants cannot be practicably removed as required, then the units must be closed to the standards applicable to landfills and post-closure care of the system must be performed, in accordance with requirements that apply to landfills [Idaho Administrative Procedures Act (IDAPA{ TA \l "IDAPA###Idaho Administrative Procedures Act" \s "IDAPA" \c 8 }) 58.01.05.009, 40 CFR 265.310].

Closure to landfill standards is an option associated with any of the alternatives, except Alternative 3. However, DOE would coordinate the landfill closure option, with the implementation of any future CERCLA actions.

2.6 Standard Practices

DOE would implement several standard practices for the chosen alternative, with the exception of the No Action Alternative, to reduce the impact to the environment, workers, and the public. Standard practices are those actions routinely implemented for any action initiated on the INEEL that avoid impacts altogether, minimize impacts, rectify impacts, reduce or eliminate impacts, or compensate for the impact. These standard practices would become an integral part of the plan to ensure that the overall effects of the action would not be significant (See Table 2).

Table 2. Standard Practices.

Air Emissions. DOE would limit fugitive dust emissions from deactivation and post-deactivation phases in compliance with IDAPA 58.01.01.650 and best management practices (EPA 1992{ TA \l "EPA (U. S. Environmental Protection Agency), 1992, *Storm Water Management for Construction Activities -- Developing Pollution Protection Plans and Best Management Practices*, EPA 832-R-92-005, Office of Wastewater Enforcement and Compliance, Washington, D.C." \s "EPA 1992" \c 9 }). As workers remove water from the basins, they would replace it with grout to control the spread of radioactive contamination. DOE would stabilize contaminated surfaces in the aboveground portions of the facilities with fixatives before demolition. In addition, DOE may use localized HEPA-filtered enclosures to control radiation releases to the environment during the grouting process.

Workers would sequence deactivation activities to reduce radionuclide resuspension and control emissions.

Soil Erosion. DOE would keep the disturbed area small and use erosion controls to minimize soil disturbance and loss. In addition, DOE would prepare a revegetation plan and/or a weed control plan.

Water. DOE would adhere to an INEEL Storm Water Pollution Prevention Plan for Industrial Activities (SWPPP-IA{ TA \l " SWPPP-IA###Storm Water Pollution Prevention Plan for Industrial Activities" \s " SWPPP-IA" \c 8 }) at the INTEC facility to protect surface waters. DOE would control and minimize water infiltration by building an asphalt apron around the buildings, causing rain water to run off away from the building and construction area. DOE would prevent ground water contamination in accordance with IDAPA 58.01.11.400 by properly disposing of the 1,500,000 gal of water from the basins and controlling contamination during the deactivation and post-deactivation process. Annual evaluations are conducted by the SWPPP-IA team to determine compliance with the plans and the need for revising the plan.

Biology/Ecology. DOE would relocate or remove (during the non-nesting season) nests of any migratory birds (excluding house sparrows, starlings, and pigeons) found nesting in the facility complexes.

Cultural Resources. Alternative 1 would have adverse impacts to historic INEEL properties. DOE would proceed with any "**undertakings**"{XE "**Undertakings**. Undertakings refers to a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency including those carried out by or on behalf of an agency, those carried out with Federal financial assistance, those requiring a Federal permit, license, or approval, and those subject to State or local regulation administered pursuant to a delegation or approval by a Federal agency."} in accordance with substantive requirements outlined in a Memorandum of Agreement (MOA{ TA \l "MOA###Memorandum of Agreement" \s "MOA" \c 8 }) with DOE-ID, Idaho State Historic Preservation Office (SHPO{ TA \l "SHPO###State Historic Preservation Office" \s "SHPO" \c 8 }), and the Advisory Council on Historic Preservation (ACHP{ TA \l "ACHP###Advisory Council on Historic Preservation" \s "ACHP" \c 8 }). This MOA was developed through consultations with the signatories and other interested parties as required by Section 106 of the National Historic Preservation Act. In the event workers discover materials, such as bones, chips or flakes, "arrowheads," or charcoal-stained soil during deactivation activities, DOE would invoke the INEEL Stop Work Authority. Invoking the Stop Work Authority would temporarily halt all excavation until the INEEL Cultural Resource Office provides a clearance or mitigative action plan.

Waste. DOE would reduce the volume of waste by using available treatment options (both on and off-Site) or recycling of wastes to minimize the amount disposed of or stored in hazardous or radioactive disposal and storage facilities. DOE may leave noncontaminated waste materials in the basins and grout in place under Alternative 1. All waste would be grouted in place for Alternative 2. Process equipment and structural components in the abovegrade areas would be sized to take maximum advantage of available capacity in the basins. DOE is preparing a RCRA closure plan, which will require a 30-day public review, to describe in detail how closure would occur. The Idaho Department of Environmental Quality must approve the plan before initiation of closure activities.

3. AFFECTED ENVIRONMENT

3.1 General Description

The INEEL is an 890-square-mile DOE facility located on the Eastern Snake River Plain in southeastern Idaho (see Figure 3). The SNF & INEL FEIS extensively describes the physical and biological environment of the region in general and the INEEL in particular. DOE controls all land within the INEEL, and public access is restricted to public highways, DOE-sponsored tours, special-use permits, and the Experimental Breeder Reactor I National Historic Landmark. DOE also accommodates Shoshone-Bannock tribal member access to areas on the INEEL for cultural and religious purposes.

The INEEL is located primarily in Butte County, but also occupies portions of Bingham, Bonneville, Clark, and Jefferson counties. The 1990 census indicated the following populations (in parentheses) for cities in the region: Idaho Falls (43,929), Pocatello (46,080), Blackfoot (9,646), Arco (1,016), and Atomic City (25) (DOC 1990{ TA \l "DOC (U. S. Department of Commerce, Bureau of Census), 1990, *Census of Population and Housing, 1990, Public Law 94-171 Data*, CD-ROM Technical Documentation (prepared 1991)." \s "DOC, 1990" \c 9 }). Approximately 127,554 persons reside within a 50-mi radius of the INTEC. However, no permanent residents reside on the INEEL.

The INEEL and surrounding area are formally designated as an attainment area for any pollutant (such as SO_x, NO_x, PM-10) for which a national ambient air quality standard exists. It is further classified under the **Clean Air Act**{XE "**Clean Air Act**. Enacted in 1967 by congress, an act focused on regulation of ambient air quality to protect public health and welfare. Originally a set of principles to guide states in controlling sources of air pollution (the 1967 Air Quality Act), and evolving through a series of amendments (1970, 1977, and 1999 Clean Air Act Amendments) into a lengthy series of specific control requirements that the federal government must implement and statues, in large measure, must administer."} as a **Prevention of Significant Deterioration**{XE "**Prevention of Significant Deterioration**. Clean Air Act regulations designed to '*protect public health and welfare from any actual or potential adverse effect . . .*', U. S. Code, Title 42, The Public Health and Welfare, Chapter 85--Air Pollution Prevention and Control, Subchapter I--Programs and Activities, Part C--Prevention of Significant Deterioration of Air Quality."} Class II area, an area with reasonable or moderately good air quality that allows moderate industrial growth. Craters of the Moon Wilderness Area, which is about 15 mi from the INEEL boundary, is classified as a Prevention of Significant Deterioration Class I area, and is the nearest area to the INEEL where additional degradation of local air quality is severely restricted.

No **threatened or endangered species**{XE "**Threatened and Endangered Species**. Any plants or animals that are likely to become endangered species"} are known to be resident to the INEEL.[a] However, the Bald Eagle (*Haliaeetus leucocephalus*), a threatened species, is a regular winter visitor to the north end of the INEEL (the Bald Eagle has been proposed for delisting). Biologists have occasionally observed Peregrine Falcons (*Falco peregrinus*) on the INEEL during their spring migration (the Peregrine Falcon was delisted in 1999). Several reliable, but unconfirmed sightings of the gray wolf (*Canis lupus*) on the INEEL have been reported in the last decade. The most recent, in October 2000, about 4 miles southeast of the INTEC. Although the U.S. Fish and Wildlife Service (USFWS{ TA \l "USFWS###U.S. Fish and Wildlife Service " \s "USFWS" \c 8 }) lists the gray wolf as an endangered species, the agency classifies wolves, in Idaho, as members of an experimental, nonessential population. Ute Ladies'-tresses (*Spiranthes diluvialis*) is a listed, threatened species that occupies wet meadow habitat. Although neither the plant nor suitable habitat for Ute ladies'-tresses have yet been found on the

a. Blew, R. D. Letter to R. L. Twitchell, "Update to U.S. Fish and Wildlife Service List of Threatened and Endangered Species on the Idaho National Engineering and Environmental Laboratory, March 7, 2001.

INEEL, a systematic search for the species at the right time of year has not been conducted. In addition, the USFWS has concerns about the following plants and animals: long-eared myotis (*Myotis* evotis),and small-footed (*M.* leibii), townsend's big-eared bat (*Plecotus townsendii*), pygmy rabbit (*Brachylagus idahoensis*), merriam's shrew (*Sorex merriami*), greater sage-grouse (*Centrocercus urophasianus*), long-billed curlew (*Numenius americanus*), ferruginous hawk (*Buteo regalis*), northern sagebrush lizard (*Sceloporus graciosus graciosus*), slender moonwort (*Botrychium lineare*), and painted milkvetch (*Astragalus ceramicus*). Several of these have been observed near INTEC. The USFWS has reviewed a petition to list the sage grouse under the Endangered Species Act, but has denied the petition to-date, though concerns about its rapid decline continue. There are inactive sage grouse leks within a few hundred meters of INTEC.

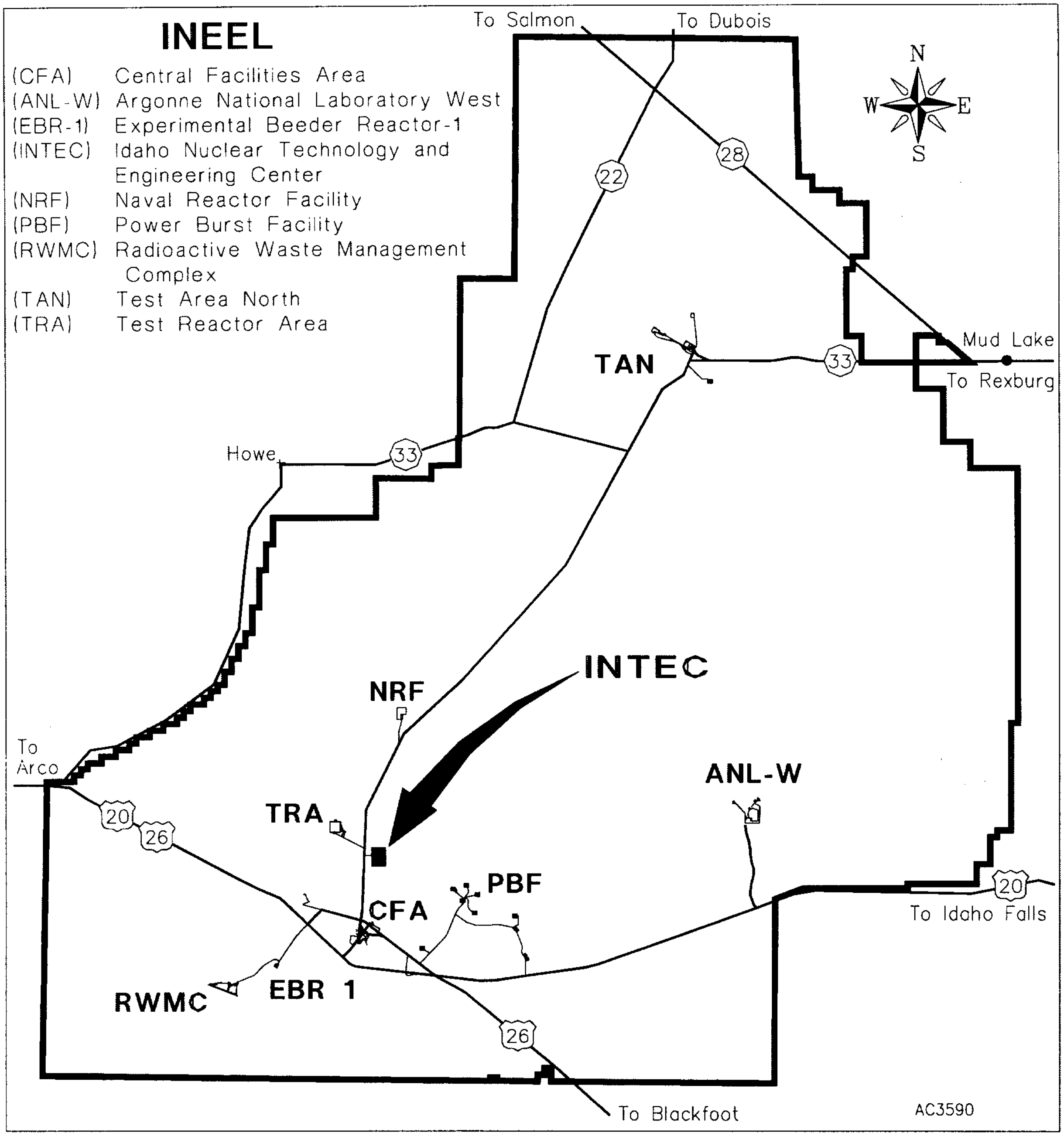

Figure 3. Location of INEEL Facilities.

Surface water flows on the INEEL consist mainly of three streams draining intermountain valleys to the north and northwest of the Site: the Big Lost River, the Little Lost River, and Birch Creek. Flows from Birch Creek and the Little Lost River seldom reach the INEEL because of irrigation withdrawals upstream. The times when the Big Lost River and Birch Creek flow onto the INEEL are usually before the irrigation season, or during high water years.

DOE is required to evaluate the risk of flooding from a **probable maximum flood**{XE "**Probable Maximum Flood**. Hypothetical flood considered to be the most severe calculated flooding event possible."}, a 100-yr flood event and, in some cases, a 500-yr event (10 CFR 1022, *Compliance with Floodplains/Wetlands Environmental Review Requirements*). Flooding from the Big Lost River might occur on-Site, along the Big Lost River floodplain, if high water in the Mackay Dam or the Big Lost River were coupled with a dam failure. Koslow and Van Haaften (1986{ TA \l "Koslow, K. N., and D. H. Van Haaften, 1986, *Flood routing analysis for a Failure of Mackay Dam*, EGG-EP-7184." \s "Koslow and Van Haaften (1986)" \c 9 }) examined the consequences of a Mackay Dam failure during a seismic event, structural failure coincident with the 100- and 500-yr recurrence interval floods, and during a probable maximum flood. The results from all dam failures studied indicate flooding would occur outside the banks of the Big Lost River from Mackay Dam to the INEEL at Test Area North. The water velocity on the INEEL from these extreme events would range from 0.6 to 3.0 ft/s (Koslow and Van Haaften 1986{ TA \s "Koslow and Van Haaften (1986)" }). In addition, Koslow and Van Haaften (1986){ TA \s "Koslow and Van Haaften (1986)" } estimated water depths outside the banks of the Big Lost River would range from 2 to 4 ft. The INEEL has conducted a number of flood evaluations that predict the potential for 100-yr riverine flood events either directly (Berenbrock and Kjelstrom 1998{ TA \l "Berenbrock, C. and L. C. Kjelstrom, 1998, Preliminary Water-Surface Elevations and Boundary of the 100-Year Peak Flow in the Big Lost River at the Idaho National Engineering and Environmental Laboratory (DOE/ID-22148; US Geological Survey WRIR 98-4065)." \s "Berenbrock and Kjelstrom, 1998" \c 9 }; Downs et al, 1999{ TA \l "Downs, W., A. W. Miller, J. Bledsoe, E. J. Nelson, M. Radaideh, and C. Smemoe, 1999, *Probabilistic Hydrologic Modeling for the Proposed High Level Waste Treatment Facility at the Idaho National Engineering and Environmental Laboratory*. Department of Civil and Environmental Engineering, Brigham Young Unversity, Provo, Utah." \s "Downs, et al. 1999" \c 9 }) or indirectly (e.g., Koslow and Van Haaften, 1986{ TA \s "Koslow and Van Haaften (1986)" }). In a few cases the INEEL evaluated areas for the potential for a 100-yr overland flood (e.g., Zukauskas et al. 1991{ TA \l "Zukauskas, J. F., D. H. Hogan, R. M. Neupauer, J. F. Sagendorf, 1991, *Conceptual Design for Surface Water Drainage Control Upgrades for the RWMC Wastershed and the Transuranic Storage Area*, EG&G Idaho, Idaho Falls, ID." \s "Zukauskas et al., 1991" \c 9 }; Dames and Moore 1993{ TA \l "Dames and Moore, 1993, Flood Evaluations Study; Radioactive Waste Management Complex; Idaho National Engineering and Environmental Laboratory; Idaho Falls, Idaho." \s "Dames and Moore 1993" \c 9 } and 1996{ TA \l "Dames and Moore, 1996, Flood Evlautions Study; 500-Year Storm Event; Radioactive Waste Management Complex; Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho." \s "Dames and Moore 1996" \c 9 }; and Taylor et al. 1994{ TA \l "Taylor, D. D., R. L. Hoskinson, C. O. Kingsford, and L. W. Ball, 1994, Preliminary Siting Activities for the New Waste Handling Facilities at the Idaho National Engineering and Environmental Laboratory (EGG-WM-11118)." \s "Taylor et al., 1994" \c 9 } and Niccum, 1973{ TA \l "Niccum, R. M., 1973, *Flooding Potential at the Idaho Chemical Processing Plant*. Aerojet Nuclear Company, Idaho Falls, ID" \s "Niccum, 1973" \c 9 }). A limited number of INEEL studies evaluated the potential for a 500-yr overland flow flood event (e.g., Dames and Moore 1993{ TA \s "Dames and Moore 1993" } and 1996{ TA \s "Dames and Moore 1996" }; Taylor et al. 1994; Zukauskas et al. 1991{ TA \s "Zukauskas et al., 1991" }). No direct studies have been conducted at the INEEL to evaluate the potential for a 500-yr riverine flood event, as required by 10 CFR 1022. However, since this project does not meet criteria for a "critical action", a 500-yr riverine or overland flow floodplain delineation is not required. Critical action is defined in 10 CFR 1022 as "any activity for which even a slight chance of flooding would be too great. Such actions may include the storage of highly volatile, toxic, or water reactive materials".

3.2 INTEC Background and Mission

INTEC was one of the first facility areas developed on the INEEL. The original role of INTEC was to recover uranium from the Materials Test Reactor spent fuel elements. DOE later expanded this role to include processing of spent fuel from other sources.[a] Construction to support the processing role began in

a. DOE (U. S. Department of Energy), 1998, *The Idaho National Engineering and Environmental Laboratory, A Historical Context and Assessment, Narrative and Inventory*, Idaho Falls, INEEL/EXT-97-01021, February 1998.

1951 (DOE 1996a{ TA \s "DOE 1996a" }). DOE's initial plans were for an 82-acre facility. INTEC was later expanded to its present size of about 265 acres, 210 acres within a security perimeter fence and currently about 55 acres outside the fence. Several environmental restoration projects are to be located outside the fence. These include a system of storm water drains, the INEEL CERCLA Disposal Facility and new percolation ponds.

The INTEC mission is to receive and store SNF and manage radioactive wastes and develop new technologies for waste management in a cost-effective manner that protects the safety of INEEL employees, the public, and the environment.

3.2.1 Landscape View

The Big Lost River drainage area, located to the north and west of the INEEL, consists of approximately 1,400 square miles. The Big Lost River is considered to be the most likely source of flooding at INTEC. The INTEC Fuel Receipt and Storage Facility (CPP-603A) is about 0.5 mi from the Big Lost River channel and about 11ft above the riverbed elevation. The INEEL Flood Diversion System was constructed in 1958 and enlarged in 1984. It has effectively prevented flooding from the Big Lost River from flowing onto INEEL facilities.

Delineation of the 100-yr and 500-yr riverine and overland flow floodplains is required by 10 CFR 1022, "Compliance with Floodplain/Wetland Environmental Review Requirements" for the types of operations conducted at INTEC. The 100-yr Big Lost River riverine floodplain has been mapped on the INEEL (Koslow and Van Haften 1986{ TA \s "Koslow and Van Haaften (1986)" }), Brigham Young University (Downs et al. 1999{ TA \s "Downs, et al. 1999" }), the U.S. Bureau of Reclamation (1999{ TA \l "U. S. Bureau of Reclamation, 1999, Phase 2 Paleohydrologic and Geomorphic Studies for the Assessment of Flood Risk for the Idaho National Engineering and Environmental Laboratory; Report 99-7." \s "BOR 1999" \c 9 }) and the United States Geological Survey (Berenbrock and Kjelstrom 1998{ TA \s "Berenbrock and Kjelstrom, 1998" }). No 100-yr overland flow floodplain delineation has been conducted for the INTEC.

The 1986 INEEL study "Flood Routing Analysis for a Failure of Mackay Dam" is the most conservative of the 100-yr riverine floodplain studies conducted at the INEEL. It is more conservative than the other studies and is also more conservative than typical Federal Insurance Administration/Federal Emergency Management Agency 100-yr flood studies, because it takes failure of the Mackay Dam into account. This study has been accepted by DOE-ID (Perkins 2001[a]) for RCRA floodplain delineation purposes at the INEEL.

The 1986 INEEL study estimates the flow volumes and water surface elevations at the INEEL during a peak flow in the Big Lost River. The study estimates a flow rate of 24,870 ft^3/s at the INTEC, which translates to a flood elevation of 4,916-ft above sea level. The elevation of CPP-603 is 4,917-ft.

Much of the area immediately surrounding INTEC to the west and south is dominated by crested wheatgrass (*Agropyron cristatum*), a European **perennial**{XE "**Perennial**. A plant that lives three or more years."} bunch grass seeded in disturbed areas. Native **sagebrush-steppe**{XE "**Sagebrush-steppe**. A large, relatively flat, treeless region that experience wide temperature changes, with sagebrush being the dominant vegetation characteristic."} vegetation dominates much of the area north and east of INTEC.

a. Perkins, T. Letter to R. H. Guymon, (TS-ETSD-01-041), Technical Direction Concerning Compliance with Flooplain/Wetlands Environmental Review Requirements (10CFR 1022) and the National Environmental Policy Act, February 21, 2001.

Many sagebrush-steppe plant species have traditional and sacred significance to the Shoshone-Bannock Tribes.

The Snake River Plain Aquifer, which underlies the INEEL, was designated a sole-source aquifer by the EPA in 1991 (56 Federal Register [FR{ TA \l "FR###Federal Register" \s "FR" \c 8 }] 50634), because groundwater supplies more than 50% of the drinking water consumed within the Eastern Snake River Plain. In addition, an alternative drinking water source or combination of sources is not available.

The Snake River Plain Aquifer underlies INTEC at a depth of approximately 450 ft. DOE discharged liquid low-level radioactive and dilute chemical wastes to the subsurface through **injection wells**{XE "**Injection Wells**. Wells into which fluids are injected for purposes such as waste disposal."} at INTEC and the nearby Test Reactor Area between 1952 and 1984. Waste reduction, treatment, and disposal to surface evaporation and **percolation**{XE "**Percolation**. The movement of water downward and radially through the sub-surface soil layers, usually continuing downward to the groundwater."} ponds has since replaced liquid-waste disposal by injection. Water withdrawn from the aquifer near INTEC for facility processes and drinking water meets the State of Idaho drinking water standards for all constituents.

A 1986 field study identified three perched water bodies that occur at depths from about 30 to 322 ft beneath the INTEC, and extend laterally as far as 3,600 ft. The chemical concentrations, shape, and size of these perched water bodies have fluctuated over time in response to the volumes of water discharged to the INTEC percolation ponds (Irving 1993{ TA \l "Irving, J. S., 1993, *Environmental Resource Document for the Idaho National Engineering Laboratory*, Volumes 1 and 2, EGG-WMO-10279." \s "Irving 1993" \c 9 }).

Archaeological sites left by Native American hunter-gatherers from 12,000-150 years ago dot the landscape surrounding INTEC and continue to be important to the Shoshone-Bannock Tribes. Scientists have discovered evidence of well preserved, early 20th Century farming/homesteading near INTEC. Within the fenced perimeter of the facility, archaeological and early historical sites are not likely to be preserved. However, a variety of INTEC structures played an important role in the early development of processes and facilities for managing nuclear fuels and wastes.

A 1997 historic building inventory and assessment study identified 153 INTEC buildings, including trailers and temporary buildings. Of the 153 buildings identified and assessed, 38 were determined to be eligible for nomination to the National Register of Historic Places, including CPP-603.[a, b]

3.2.2 Contaminant Inventory

Demmer[c, d] estimated inventories of radiological and nonradiological materials that currently remain in the sludge in the CPP-603A basins (see Table 3). McCarthy (2001{ TA \l "McCarthy, J. M., 2001,

a. DOE (U. S. Department of Energy), 1998, *The Idaho National Engineering and Environmental Laboratory, A Historical Context and Assessment, Narrative and Inventory (Draft)*, Idaho Falls, INEEL/EXT-97-01021, February 1998.

b. Miller, S. J., 1995, *Idaho National Engineering Laboratory Management Plan for Cultural Resources (Final Draft)*, DOE/ID-10361, Rev. 1, U.S. Department of Energy, Idaho Falls, ID. July, 1995.

c. Demmer, R. L., Letter to T. Waite, RLD-08-96, Basin Sludge Calculations for CPP-603 Fuel Basins, August, 1996 and Letter to T. Waite, RLD-11-96, Recalculation of Organic Data for CPP-603 Fuel Basins, October 23, 1996.

d. Demmer, R. L. Letter to T. Waite, RLD-11-96, Recalculation of Organic Data for CPP-603 Fuel Basins, October 23, 1996.

\"Transport Simulation Approach for the Risk Assessment for Deactivation of INTEC Plant Building CPP-603, Engineering Design File 1962.\" McCarthy." \s "McCarthy 2001" \c 9 }) provided the analysis for the inventories, **source terms{**XE "**Source Terms**. The type and quantity of pollutants emitted to air from a specific source or group of sources.**}**, and models used to estimate release fractions, doses, and cancer risk. Also located in the basins are numerous pieces of metal, including fuel-end pieces reading up to 200 R/hr because of mixed fission products and mixed activation products. Other items such as fuel buckets, various tools, stainless-steel racks, disposal containers, etc. are also contained in the basins. These objects are contaminated with the various radionuclides contained in the sludge.

Table 3. Radionuclides and Nonradioactive Inventory in CPP-603A Basins and VES-SFE-106 Tank System

Radionuclide Inventory

Contaminant	Initial Estimated CPP-603 Inventory of Sludge (Ci)	Initial Estimated VES-SFE-106 Inventory (Ci)
Am-241	4.20x10^{-02}	2.00x10^{-02}
Cm-244	7.00x10^{-04}	NA
Co-58	1.50x10^{-03}	NA
Co-60	8.47x10^{01}	7.00x10^{-01}
Cs-134	6.66x10^{-01}	2.00x10^{-01}
Cs-137	3.40x10^{01}	2.49x10^{03}
Eu-152	5.61x10^{02}	1.31x10^{01}
Eu-154	3.16x10^{02}	6.80x10^{00}
Eu-155	3.13x10^{01}	NA
Nb-94	1.00x10^{00}	3.00x10^{-01}
Np-237	5.00x10^{-03}	0.00x10^{00}
Pu-238	4.20x10^{-01}	3.00x10^{-01}
Pu-239	2.20x10^{00}	6.00x10^{-02}
Sb-125	7.80x10^{00}	2.20x10^{00}
Sr-90[a]	5.85x10^{01}	2.86x10^{01}
Th-228	1.50x10^{-02}	2.00x10^{-03}
Th-230	NA	1.00x10^{-03}
U-234	3.03x10^{-01}	NA
U-235	1.20x10^{-02}	1.00x10^{-01}
U-236	4.00x10^{-04}	NA
U-238	1.70x10^{-03}	2.0x10^{-03}

a. Assume total Sr is all Sr-90
NA = Not Available

Nonradioactive Inventory

Contaminant	Initial Estimated CPP-603 Inventory of Sludge (Ci)	Initial Estimated VES-SFE-106 Inventory (Ci)
Aluminum	3.89x10^{09}	2.36x10^{09}
Arsenic	1.80x10^{06}	3.13x10^{05}
Barium	1.91x10^{07}	4.03x10^{05}
Beryllium	3.77x10^{04}	0.00x10
Cadmium	2.31x10^{07}	1.08x10^{06}
Chloride	7.85x10^{07}	0.00x10
Chromium	7.22x10^{07}	1.31x10^{06}
Lead	9.50x10^{07}	1.82x10^{06}
Mercury	5.34x10^{01}	9.50x10^{03}
Nickel	1.54x10^{06}	0.00x10
Selenium	6.04x10^{05}	1.25x10^{05}
Silver	3.84x10^{04}	7.60x10^{03}
Uranium	1.07x10^{07}	7.42x10^{07}
Zinc	1.43x10^{09}	0.00x10
Acetone	2.95x10^{05}	0.00x10
Benzene	1.08x10^{04}	0.00x10
Bromomethane	2.10x10^{03}	0.00x10
2-Butanone	3.60x10^{03}	3.10x10^{03}
1,2-Dichloroethane	3.30x10^{03}	0.00x10
Methylene Chloride	3.30x10^{03}	0.00x10
4-Methyl-2-pentanone	3.50x10^{03}	2.00x10^{03}
m- and p- Xylene	7.20x10^{03}	0.00x10
o-Xylene	3.40x10^{03}	0.00x10
Styrene	3.80x10^{03}	0.00x10
Toluene	6.00x10^{03}	4.00x10^{02}

4. ENVIRONMENTAL CONSEQUENCES

This section describes the environmental consequences that may result from implementing one of the alternatives. Although, the proposed action is not specifically called out in the tables or text, Alternatives 1, 2, and 3 bound the potential environmental consequences of the proposed action. Consequences or impacts can be either direct or indirect. Direct impacts occur from a simple stimulus and response relationship such as exposure to radionuclides results in a certain dose. Indirect impacts occur from secondary or higher-order relationships that act through intermediate sets of stimuli and responses such as toxic contamination of bird egg shells through birds eating contaminated prey (Regier and Rapport 1978{ TA \l "Regier, H. L. and D. J. Rapport, 1978, *Ecological Paradigms, Once Again, Bulletin of the Ecological Society of America*, 59:2-6." \s "Regier and Rapport 1978" \c 9 }). A third type of impact, cumulative impact, is the incremental impact of a single project or action added to all other past, present, and reasonably foreseeable future actions.

4.1 Facility Disposition Alternatives

Tables 4 and 5 summarize deactivation and post-deactivation consequences. This EA shows that the biggest differences among alternatives are in cost, project duration, worker dose, and waste disposal.

Alternative 3 has the largest relative cancer risk from airborne contaminants during deactivation activities to the population, followed by Alternative 1. The cancer risks associated with each alternative are very small. Alternative 3 would result in the greatest exposure to the **maximally exposed individual**{XE "**Maximumally Exposed Individual**. A hypothetical individual defined to allow dose or dosage comparison with numerical criteria for the public. This individual is located at the point on the DOE site boundary nearest to the facility in question."} (MEI{ TA \l "MEI###maximally exposed individual" \s "MEI" \c 8 }) and population through ingestion during post-deactivation activities. External doses to workers would also be greatest with Alternative 3. Alternative 2 would generate less waste material than Alternative 1; and, Alternative 3 would generate the largest amount of waste material.

The No Action alternative poses greater risks to all receptors over the long-term. For instance, the radionuclide emissions to the air would continue and health risks associated with exposure and groundwater ingestion would be higher under the No Action alternative than for any of the other alternatives.

Alternative 3 would cost about four times as much as Alternatives 1 and 2. Alternative 4 ("Continued" No Action) would result in increasing S&M costs.

Sections 4.1.1 through 4.1.8 discuss the potential direct and indirect impacts to air, water, geology and soil, biological, cultural, and land use and visual resources and health effects and waste management. Section 4.2 discusses the potential impacts to the No Action Alternative. Finally, section 4.3 discusses the potential cumulative impacts of the facility disposition alternatives.

4.1.1 Air Resources

Deactivation Effects – Pyle (2001{ TA \l "Pyle, J. D., 2001, \"Potential Air Emissions Associated with Deactivation, Decommissioning, and Dismantlement of the CPP-603A Basin Project,\" Engineering Design File 1931." \s "Pyle 2001" \c 9 }) estimates potential radionuclide emissions and associated doses resulting from deactivation activities. The release scenario assumes that some percentage of the remaining radionuclide inventory in CPP-603A would be resuspended in the air and released at ground level. Pyle (2001{ TA \s "Pyle 2001" }) also shows the estimated nonradiological releases for CPP-603A. The estimated releases and doses are conservative for the following reasons:

- Standard practices such as temporary, high-efficiency particulate air (HEPA{ TA \l "HEPA###high-efficiency particulate air (as in HEPA filter)" \s "HEPA" \c 8 })-filtered enclosures would likely reduce emissions below those calculated herein.
- Although deactivation operations would be carried out over several years, the entire radionuclide release is assumed to occur in a single year.

As outlined in Pyle (2001{ TA \s "Pyle 2001" }), the release scenario for the alternatives assumes contaminant control resuspension fractions for the remaining radiological and non-radiological inventory based on the control technique, (i.e., dry decontamination and wet decontamination techniques, contaminant stabilization with fixatives, and in place grouting). These control fractions were combined with applicable resuspension fractions to determine the overall emission release fraction under each contaminant control scenario. The overall release fraction was used to estimate the potential air emissions on a pollutant specific basis. Potential radiological releases were modeled using the CAP-88 computer code (EPA 1990{ TA \l "EPA (U. S. Environmental Protection Agency), 1990, The Clean Air Act Assessment Package - 1988 (CAP-88), a Dose and Risk Assessment Methodology for Radionuclide Emissions to Air, Volumes 1-3, prepared by D. A. Beres, SC&A, Inc., for the U. S. Environmental Protection Agency." \s "EPA 1990" \c 9 }) to estimate the resulting effective dose equivalent.

The calculated dose to the MEI from the alternatives, including the No Action Alternative, in combination with the 1999 total effective dose equivalent to the MEI from the entire INEEL (7.92×10^{-3} mrem), is well below the National Emission Standards for Hazardous Air Pollutants (NESHAP{ TA \l "NESHAP###National Emission Standards for Hazardous Air Pollutants" \s "NESHAP" \c 8 }) 10-mrem-dose standard established by federal regulation, 40 CFR 61 Subpart H, (see Table 4). Subpart H states that emissions of radionuclides to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive an effective dose equivalent of 10 mrem/yr.

The calculated worker dose from the alternatives would be below the INEEL occupational dose limit of 500 mrem/worker/yr (see Table 4). In fact, worker doses would likely be less than those calculated. This is because the worker is assumed to be at the location of maximum exposure 8 hr/day, every workday for 50 yrs to receive the maximum inhalation dose and ground surface dose from deposited radionuclides. This is a highly unlikely scenario.

Doses to the population living within 50 mi of the INTEC (see Table 4) would be low for the alternatives. Although the only dose standard is for the MEI (discussed above), the dose from the alternatives, including the No Action Alternative, is well below those received from background sources of radiation in southeast Idaho of about 350 mrem/person/yr. This is equivalent to 44,600 person-rem/yr in the population of 127,554.

Calculated releases of nonradioactive, hazardous contaminants would be, in most cases, well below applicable health-based emissions limits for the alternatives. The exception is cadmium, which could exceed the screening emission limit set by the State of Idaho. For cadmium and other carcinogens, modelers calculated one-year average concentrations (based on the available inventory) at the MEI location on the INEEL boundary. All calculated concentrations were below Idaho's acceptable ambient concentrations for carcinogens (AACC{ TA \l "AACC###Acceptable Ambient Concentrations for Carcinogens" \s "AACC" \c 8 }) (Pyle 2001{ TA \s "Pyle 2001" }).

Potential air emissions from Alternative 1 are slightly higher than those of Alternative 2. This increase in emissions is due to additional contaminant control techniques, which would likely be required during deactivation, decommissioning, and dismantlement of CPP-603A basin. More specifically, in this scenario a portion of the contamination associated with the FECF Hot Cell would be mitigated using one of three contaminant control techniques; dry decontamination, wet decontamination, and contaminant stabilization techniques. These three techniques all have higher resuspension factors than in-place grouting as a contaminant control technique. The slight decrease in potential emissions of Alternative 2 compared to Alternative 1 is due to the increased utilization of grouting as a control technique.

Potential air emissions from Alternative 2 are lower than both Alternatives 1 and 3 (see Table 4). The decrease in potential air emissions is likely due to decreased handling and disturbance of contaminated materials. In Alternative 2, all of the structures would be demolished, placing the structural waste in the basins, leaving the sludge and filling with grout. Of the potential resuspension factors associated with each contaminant control technique, grouting has the lowest value and would be used the most extensively in Alternative 2 (Pyle 2001{ TA \s "Pyle 2001" }).

Potential air emissions resulting from Alternative 3 were estimated to be higher than those associated with Alternatives 1 and 2. This increase in potential emissions is due to an increase in utilization of contaminant control techniques with higher applicable resuspension factors. As previously stated, grouting has the lowest resuspension factor of all contaminant stabilization techniques expected to be used in this project. Grouting would not be used as a contaminant control technique for Alternative 3.

See Section 4.1.7 for a discussion of health effects associated with these doses.

Post-Deactivation Effects – No Post-Deactivation air emissions or associated impacts are expected from

Table 4. Summary of Deactivation Impacts Across Alternatives.

Deactivation Impacts[a]	Alternative 1	Alternative 2	Alternative 3
Air Emissions			
MEI Dose	$3.6x10^{-2}$ mrem/yr	$2.5x10^{-2}$ mrem/yr	$7.6x10^{-2}$ mrem/yr
Worker Dose	$4.0x10^{1}$ mrem/yr	$2.7x10^{1}$ mrem/yr	$8.5x10^{1}$ mrem/yr
Population Dose	$1.4x10^{-1}$ person-rem/yr	$9.6x10^{-2}$ person-rem/yr	$3.0x10^{-1}$ person-rem/yr
% of Background Dose	0.001	0.0002	0.007
Geology			
Soil	Minor & localized impacts	Minor & localized impacts	Minor & localized impacts
Seismic (risk value)	About 10^{-6}	About 10^{-6}	None
Subsidence	None	None	None
Surface Water	None	None	None
Groundwater	None	None	None
Biological Resources	None	None	None
Cultural Resources			
Historical	Destroy structure eligible for National Register	Destroy structure eligible for National Register	Destroy structure eligible for National Register
Archaeological	None	None	None
Land Use	None	None	None
Visual Resources	Short-term construction related impacts	Short-term construction related impacts	Short-term construction related impacts
Health Effects			
Airborne (mrem)			
MEI Cancer Risk	$1.8x10^{-8}$	$1.2x10^{-8}$	$3.8x10^{-8}$
Worker Cancer Risk	$1.6x10^{-5}$	$1.1x10^{-5}$	$3.4x10^{-5}$
Population Cancer Risk	$7.0x10^{-5}$	$4.8x10^{-5}$	$1.5x10^{-4}$
Groundwater (mrem)	$1.3x10^{-6}$	$1.3x10^{-5}$	None
Waste Management			
Asbestos (m^3)	604	0	604
Water (gal)	0	1.5M	1.5M
Lead (lbs)	141,312	141,312	141,312
LLW (m^3)	4,729	42	7,079
HLW (m^3)	0	0	0
Mixed Waste (m^3)	85	0	85
Industrial Waste (m^3)	428	3	850
Liquid Waste (gal)	50,000	50,000	100,000
Transportation Risks[a, b]			
Accidents	0.245	$2.10x10^{-3}$	0.364
Fatalities	$1.26x10^{-2}$	$1.08x10^{-4}$	$1.87x10^{-2}$
Latent Fatalities	$1.26x10^{-3}$	$1.08x10^{-5}$	$1.87x10^{-3}$

a. Although, the proposed action is not specifically called out in the table, Alternatives 1, 2, and 3 bound the potential environmental consequences of the proposed action.
b. Transportation-related impacts are based on roundtrip shipments via truck (9 yd^3/trip). Alternative 1 would require approximately 700 shipments, approximately 6 shipments would be required for Alternative 2, and Alternative 3 would require approximately 1,040 trips.
c. Idaho High-Level Waste & Facilities Disposition Draft Environmental Impact Statement, December 1999, DOE/EIS-0287

the proposed action or alternatives, other than the No Action Alternative.

4.1.2 Geology and Soil Resources

Deactivation Effects – The alternatives would have only minor, localized impacts on the geology of the INEEL site. Deactivation activities would be of short duration and workers would reduce soil loss by keeping the areas of surface disturbance small. In addition, workers would reduce soil loss by using standard practices such as dust suppression, storm water run-off control including sediment catchment basins, slope stability, and soil stockpiling with wind erosion protection. In Alternative 3, direct impacts to geologic resources at the INEEL Site would be associated with disturbing or extracting materials from INEEL borrow sources to fill the excavations left by removing the dismantled belowgrade structures.

Post-Deactivation Effects – Seismic and volcanic hazards for the INTEC area have been assessed (Woodward-Clyde Federal Services 1996{ TA \l "Woodward-Clyde Federal Services, 1996, *Site-Specific Probabilistic Seismic Hazard Analyses for the Idaho National Engineering Laboratory*; Lockheed Idaho Technologies Company Technical Report INEL-95/0536." \s "Woodward-Clyde Federal Services 1996" \c 9 }; Hackett, W.R., Smith, R.P., and Khericha, S. 2001[a]). Ground motions to be expected are probably incapable of cracking or damaging the subsurface grouted basins resulting from Alternative 1. Probabilities of inundation of the area by basalt lava flows are in the range of 10^{-6} per year. There would be no seismic risk associated with Alternative 3, since the facility would be removed. Even if the area were covered by basalt lava flow in the distant future, significant heating of the ground would extend for only a meter beneath the present surface. This would not cause significant damage to the grouted basins and building remnants or increase the potential for release of the very low levels of contamination remaining in the structures.

The large grain size of the sediments (over 50% gravel), the unsaturated conditions of the sediments, the **high blow counts{**XE "**High Blow Counts.** Blow counts are the number of blows of a 140-pound hammer falling 4 feet required to drive a split spoon sampler one foot into a soil or sediment. Obviously the higher the blow count the more unyielding the sediment or soil. "High" blow counts refers to numbers in the range of 40 or higher generally mean that the soil or sediment is very hard and unyielding and not subject to failure."}, and the high seismic **shear wave velocity{**XE "**Shear Wave Velocity**. Shear wave velocity equals the velocity at which shear waves travel through a rock or sediment or soil. The higher the velocity, the more elastic and strong the material is."} (Geovision Geophysical Services 1997{ TA \l "Geovision Geophysical Services, 1997, *Downhole seismic logging at the TMI-2 Independent Spent Fuel Storage Installation site at the Idaho Chemical Processing Plant*; Report #98201-01 to Lockheed Martin Idaho Technologies Company, November 28." \s "Geovision Geophysical Services 1997" \c 9 }) preclude the potential for soil liquefaction during an earthquake. Data from Seed et al. 1983{ TA \l "Seed, R.B., Idress, I.M., and Arango, I., 1983, *Evaluation of liquefaction potential using field performance data*, Journal of Geotechnical Engineering Division, ASCE, V.97, No.3." \s "Seed et al. (1983)" \c 9 } show that soils would not liquefy when they sustain standard penetration test blow counts greater than 35 blows/ft. Extensive drilling and geotechnical investigations at INTEC (Northern Engineering and Testing 1987{ TA \l "Northern Engineering and Testing, 1987, *Report of Geotechnical Investigation for the Special Isotope Separation Facility, Idaho Chemical Processing Plant*, Idaho National Engineering Laboratory; Prepared for M-K Ferguson Company." \s "Northern Engineering and Testing 1987" \c 9 }) have shown that most standard penetration test counts per foot in sandy gravels exceed 35 and reach values as high as 200 to 300 (DOE 1999{ TA \l "DOE (U. S. Department of Energy), 1999, INEEL TMI-2 Interim Spent Fuel Storage Installation Safety Analysis Report, Rev. 1, Nuclear Regulatory Commission Docket #72.20" \s "DOE 1999" \c 9 }, Golder Associates 1992{ TA \l "Golder Associates, Inc., 1992, *High Level Waste Tank Farm Replacement Project, Geotechnical Investigation for*

a. Hackett, W. R., Smith, R. P., and Khericha, S., 2001, "Volcanic Hazards of the INEEL, Southeast Idaho; in Bonnichsen, B., White, C., and McCurry, M., editors, Tectonic and Magmatic Evolution of the Snake River Plain Volcanic Province, Idaho; Geologic Survey Special Publication, in press.

Westinghouse Idaho Nuclear Company." \s "Golder Associates 1992" \c 9 }, Dames and Moore 1976{ TA \l "Dames and Moore, 1976, *Soils/Foundation Investigation, New Waste Calcining Facility, INEL, for the Energy Research and Development Administration*, prepared for Fluor Engineers and Constructors, Inc., Los Angeles." \s "Dames and Moore 1976" \c 9 }, Dames and Moore 1977{ TA \l "Dames and Moore, 1977, *Report of Foundation Investigation, Flourinal and Fuel Storage Facilities, Chemical Processing Plant, Idaho Falls, Idaho.*" \s "Dames and Moore 1977" \c 9 }, and Northern Engineering and Testing 1987{ TA \s "Northern Engineering and Testing 1987" }). In addition, data from numerous sites throughout the world (Seed et al. 1983{ TA \s "Seed et al. (1983)" }, Kayen et al., 1992{ TA \l "Kayen, R.E. et al., 1992, *Evaluation of SPT-CPT- and shear wave-based methods for liquefaction potential assessment using Loma Prieta Data*, Proced. of 4th Japan-US Workshop on Earthquake Resistance Design of Lifetime Facilities and Counter Measures for Liquefaction, v.1." \s "Kayen 1992" \c 9 }) show that liquefaction does not occur in sediments or soils which have seismic shear wave velocities of greater than about 300 meters/second. Shear wave velocity measurements made at several INTEC sites show that sediments there typically have shear wave velocities of 300 to 600 meters/second (DOE 1999{ TA \s "DOE 1999" }, Dames and Moore 1976{ TA \s "Dames and Moore 1976" }, Dames and Moore 1977{ TA \s "Dames and Moore 1977" }, EG&G 1984{ TA \l "EG&G Geosciences Unit, 1984, *Report of the geotechnical investigation for the 7th Bin Set at the Chemical Processing Plant, INEL.*" \s "EG&G 1984" \c 9 }, Northern Engineering and Testing 1987{ TA \s "Northern Engineering and Testing 1987" }, Golder Associates 1992{ TA \s "Golder Associates 1992" }).

The large grain size, the unsaturated conditions, high blow counts, and high shear wave velocities also preclude the potential for consolidation of the soils under heavy loads. Consolidation is the long-term **subsidence**{XE "**Subsidence**. Subsidence is a general geologic term for usually slow, sinking of the surface of the land. Subsidence occurs in a number of ways -- sinking of heavy structures into soft soil, groundwater withdrawal, collapse of underground cavities, or some tectonic process causing the crust of the earth to warp or bend downward. In geotechnical terminology, subsidence is usually not used. Instead, one of two terms are used - settlement or consolidation. Settlement always happens when building a heavy structure ion anything, including solid rock. It is instantaneous and depends on the elastic properties of the foundation material. This happens when you fill structures with concrete, but only usually an inch or less. Consolidation however is a serious concern because it is a long-term process, it can involve several inches to feet of downward movement, and it can occur differentially causing cracking of the structure. Geologists do not expect this to occur when filling ICPP structures with grout."} of the ground due to gradual forcing of water from the soil pores due to increased load of a building or a structure. It can be a significant problem in some soils because it continues for months to years and can result in damaging differential movements of structures. However, even if INTEC soils were permanently saturated (which they are not), consolidation would not occur because the grain size is so large (sands and gravels) that no pore pressure can be developed by building loads. There would be some immediate settling of the structure as the fuel storage basins are filled with grout, but it would be small, mostly likely less than 1 in. (Jensen 1997{ TA \l "Jensen, S., 1997, *Geotechnical evaluation of the Fuel Reprocessing Complex Decommissioning project*; Engineering Design File 668, LMITCO project file #020860." \s "Jensen 1997" \c 9 }, Fritz 1995{ TA \l "Fritz, K. D., 1995, *Soil evaluation at the TMI-2 dry storage facility at ICPP*; Engineering Design File 673." \s "Fritz 1995" \c 9 }, Matzen 1995{ TA \l "Matzen, T., 1995, *Geotechnical evaluation for RCRA closure of the Waste Calcining Facility - CPP-633 - at the Idaho National Engineering Laboratory*, LMITCO Internal Report, August 11." \s "Matzen 1995" \c 9 }). This settling would be due to slight compression of the soil particles and/or slight bending of basalt layers under the increased load, and poses no threat of soil instability or long-term subsidence.

DOE does not expect impacts to geologic or soil resources from the alternatives including the No Action Alternative.

4.1.3 Surface Water and Groundwater Resources

Deactivation Effects – The alternatives would have negligible impact to either surface water or groundwater resources. Koslow and Van Haaften (1986{ TA \s "Koslow and Van Haaften (1986)" }) evaluated the potential consequences of a maximum 100-year flood event coupled with a MacKay Dam failure. DOE estimates that the probability of an occurrence for this combined event is between 10^{-6} to 10^{-8} per year. This event would result in floodwater within the INTEC-controlled area up to 4,916 ft in elevation. This is an extremely conservative assumption and exceeds the requirements for a 10 CFR 1022 floodplain determination. Although the 4,916-ft elevation is extremely conservative, it was used to determine whether the alternatives identified in this EA are located within the 100-yr riverine floodplain. It has been determined that the CPP-603A and CPP-648 facilities are at 4,917-ft elevation and therefore, located outside the 100-yr floodplain of the Big Lost River.

This project would not impact the floodplain and, based on existing studies there is no risk of a riverine flood impacting the project under the alternatives, including the No Action Alternative. In addition, the project would adhere to the requirements in the Storm Water Pollution Prevention Plan for Construction Activities (SWPPP-CA{ TA \l "SWPPP-CA###Storm Water Pollution Prevention Plan for Construction Activities " \s " SWPPP-CA " \c 8}). Therefore, this project would not significantly increase the probability of contaminants entering surface water or migrating to the Eastern Snake River Plain Aquifer.

Post-Deactivation Effects – Normal flows in the Big Lost River would not have any impact on the CPP-603A and CPP-648 facilities or their remnants. In addition, there would be no expected detrimental effects to the facility from the 100-yr riverine flood event, since the elevation of the affected facilities is above the 4,916-ft elevation. For Alternatives 1 and 2, the remnants of CPP-603A would be a "solid block" of grout and CPP-648 would be closed in accordance with the HWMA/RCRA. The uncapped grouted block would prevent the escape of contaminants for 500 years based on the analysis, which was modeled after the HLW&FD FEIS. Any potential overland flow floods would not significantly impact the structure. Alternative 3 would remove all potential sources of contamination, so there are no expected detrimental effects to surface or groundwater.

The potential risk to the groundwater pathway, from the uncapped solid block of grout containing residual contaminants was evaluated using National Council on Radiation Protection (NCRP{ TA \l "NRCP###National Council on Radiation Protection " \s "NRCP" \c 8}) screening of the radionuclides and GWSCREEN simulation for the unscreened radionuclides and chemicals and metals. Both the peak concentrations in the aquifer and peak vadose zone pore water concentrations were predicted. The peak concentrations were compared with both maximum contaminant levels (MCLs{ TA \l "MCL###maximum contaminant levels" \s "MCL" \c 8 }) and risk based limiting water concentrations. The limiting water concentration was defined as the 1×10^{-6} risk, or hazard quotient equal one, based concentration.

See Section 4.1.7 for a discussion of health effects associated with these doses.

4.1.4 Biological Resources[a]

Deactivation Effects – Alternatives 1, 2, and 3 would have no direct or indirect negative impacts on the flora, fauna, endangered species, or ecology of the INEEL Site. Closure activities would not affect the existing environment outside the INTEC fence. Over the years, DOE has disturbed the area within the fence by constructing and paving roads and erecting buildings. For Alternative 3, some of the common but less mobile fauna occupying the area from which borrow material would be excavated to fill the voids remaining after removal of structures would likely be impacted. Populations would likely recover following proper rehabilitation of the borrow source.[b]

Post-Deactivation Activities – Long-term impacts to biological resources for Alternatives 1 and 2 would consist of continued lost productivity from the lands covered by the cap, about 0.6 acres for the CPP-603A facility.

4.1.5 Cultural Resources

Deactivation Effects – Alternatives 1, 2, and 3 would destroy structures or portions of structures that are eligible for nomination to the National Register of Historic Places. An inventory and historic significance assessment study of INEEL buildings was conducted in 1997. This study identified CPP-603 as eligible by contributing features in a potential historic district through its important and unique role in the nation's reactor fuel reprocessing program.[c] Deactivation would proceed only in accordance with all the substantive requirements outlined in a MOA signed with DOE-ID, Idaho State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation (ACHP).

It is unlikely that any workers would directly impact any archaeological resources by activities concentrated within the fenced INTEC perimeter.

Post-Deactivation Effects – The INEEL's Cultural Resource Management Office does not expect long-term impacts to cultural resources, except the permanent occupation of the site by remnants of the grouted blocks for Alternatives 1 and 2.

4.1.6 Land Use and Visual Resources

Deactivation Effects – The CPP-603A facility is located within the INTEC fence, an area that has been highly disturbed by paving and building. Deactivation activities such as grouting would not affect the current land use or visual resources near the INTEC.

Post-Deactivation Effects – Most of the INEEL is open space that DOE has not designated for specific uses. Facilities and operations use about 2% of the total INEEL Site, primarily for nuclear energy research and waste management and environmental restoration support operations. Public access to INTEC and other facility areas is restricted. The INEEL Land Use Plan (DOE 1996a{ TA \s "DOE 1996a" }) indicates that INTEC would remain an industrial area with no public access for 100 years in the

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a. Because the area of consideration and the environmental consequences of this action are similar to those for Closure of the Waste Calcining Facility (DOE/EA-149), the determination that a biological assessment is not needed (Note from R. D. Blew, Stoller Corporation, Inc., April 16, 2001).

b. Borrow source impacts are covered in "Environmental Assessment and Plan for New Silt/Clay Source Development and Use at the Idaho National Engineering and Environmental Laboratory," DOE/EA-1083, May 1997.

c. DOE (U. S. Department of Energy), 1998, *The Idaho National Engineering and Environmental Laboratory, A Historical Context and Assessment, Narrative and Inventory (Draft)*, Idaho Falls, INEEL/EXT-97-01021, February 1998.

future. Land use plans and policies for INTEC and other INEEL facilities identify continued energy research, waste management and environmental restoration as the major INEEL business activities through the foreseeable future (DOE 1996a{ TA \s "DOE 1996a" }). The scenarios associated with all the alternatives, with the exception of the No Action Alternative, are included in the waste management and environmental restoration missions of the INEEL. In addition, they are consistent with current and foreseeable land use plans and would be withdrawn from any potential future use.

The INEEL has long distance views of rolling hills, buttes and volcanic outcrops; and of the Lemhi, Lost River, and Bitterroot mountain ranges that border the INEEL on the north and west. The INTEC is located on a relatively flat area surrounded by undeveloped land that supports sagebrush-steppe grassland vegetation. However, 20-ft changes in elevation are common on the INEEL and even occur near INTEC. Other INEEL industrial facilities visible from INTEC include the Central Facilities Area, Test Reactor Area, Naval Reactors Facility, and Power Burst Facility. As a result of the deactivation, the grouted basin for both Alternatives 1 and 2 would leave a 1- to 10-ft-high mound above ground level, within the INTEC fence. Following removal in Alternative 3, the belowgrade areas would be backfilled to restore the sites to a grade, contour, and visual characteristics consistent with surroundings.

4.1.7 Health Effects

The purpose of this section is to present the potential health effects to both workers and the public that would result from exposure to hazardous and radioactive material resulting from implementation of Alternative 1.[a] Modelers evaluated the airborne and external exposure pathways for deactivation activities. Health effects associated with the external exposure and groundwater ingestion pathways are associated with post-deactivation activities. For the ingestion pathway, the 100-year future occupational and residential exposures scenarios were evaluated using the refined risk assessment model for those radionuclides where the risks were greater than the lower National Oil and Hazardous Substance Pollution Contingency Plan (NCP{ TA \l "NCP###National Oil and Hazardous Substance Pollution Contingency Plan" \s "NCP" \c 8 }) target risk range of $1x10^{-6}$.

Deactivation Effects – The maximum increased lifetime risks to the MEI of developing a fatal cancer from implementing the alternatives, with the exception of the No Action Alternative, are given in Table 4 – Alternative 1, 1 in 55.5 million; Alternative 2, 1 in 83.3 million; and Alternative 3, 1 in 26.3 million. The maximum increased lifetime risks of fatal cancer for the worker 100 m distant from CPP-603A for the alternatives, with the exception of the No Action Alternative, are stated in Table 4 – Alternative 1, 1 in 62,500; Alternative 2, 1 in 90,900; and Alternative 3, 1 in 29,400, compared to the natural risk from all other sources of 1 in 13.

In the affected population of 127,554 persons, the maximum average increased lifetime risk of an individual developing a fatal cancer as a result of Alternatives 1, 2, or 3 would be about 1 in 1.82 billion, 1 in 2.63 billion, and 1 in 833 million, respectively. In this same population, each individual has a 1 in 13 chance of a fatal cancer over a 50-year lifetime from all other sources (National Cancer Institute [NCI{ TA \l "NCI###National Cancer Institute" \s " NCI" \c 8 }] 1994{ TA \l "NCI (National Cancer Institute), 1994, SEER Cancer Statistics Review, 1973-1991, On NCI and NIH (National Institute of Health) \"Cancernet.\"" \s "NCI 1994" \c 9 }). In other words, the additional cancer risk posed by the alternatives would not be discernable from the "normal" cancer fatality rate.

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a. Radiation exposure and its consequences are topics of interest to the public near nuclear facilities. For this reason, this EA discusses the consequences of exposure to radiation, although the risks of radiation exposure evaluated in this EA are small. Refer to "Helpful Information for the General Reader" for an explanation on the measurement of radiation and the different sources of radiation (see page iii).

Post-Deactivation Effects – Health effects associated with the groundwater ingestion pathway are associated with post-deactivation activities (McCarthy 2001{ TA \s "McCarthy 2001" }). For the ingestion pathway, residential exposures scenarios were evaluated using the refined risk assessment model for those radionuclides where the risks were greater than the lower NCP target risk range of $1x10^{-6}$. Potential risks and hazards associated with the contaminant of potential concern (COPC{ TA \l "COPC###contaminant of potential concern" \s "COPC" \c 8 }) at the INTEC-603 basins were assessed for residential or public receptors.

In addition, any residual contamination left in CPP-603A at the completion of deactivation will be evaluated as part of the INTEC Composite Analysis that would be prepared to comply with DOE Order 435.1. The INTEC Composite Analysis will assess the contribution of any residual waste remaining at INTEC, including any remaining at CPP-603A, to the cumulative risk associated with all contamination remaining at INTEC (see Section 4.3, page 35).

Based on the screening using the NCRP screening dose factors,[a] the radionuclides COPCs for Alternative 1 were found to be Am-241, Nb-94, Np-237, Pu-238, Pu-239, U-234, U-235, and U-238 (McCarthy 2001{ TA \s "McCarthy 2001" }). Alternative 2 included the same radionuclides COPCs with the addition of Cs-137 and Th-230. A risk assessment was then performed on these COPCs for the groundwater pathway using the methodology presented in McCarthy (2001{ TA \s "McCarthy 2001" }). Pu-239 is the only contaminant that was predicted to have peak aquifer concentrations greater than the $1x10^{-6}$ risk based concentration for both Alternatives 1 and 2 (see Table 5).

Pu-239 is the only contaminant predicted to have peak aquifer concentrations greater than the $1x10^{-6}$ risk based concentration for both Alternatives 1 and 2. The Pu-239 peak concentrations are predicted to occur in 20,000 years. The Pu-239 predicted peak aquifer concentrations correspond to a risk of $1.3x10^{-6}$ for Alternative 1 and $1.3x10^{-5}$ for Alternative 2 (see Table 5). In addition, Alternative 2 had a predicted peak aquifer arsenic concentration that corresponds to a risk of $2x10^{-6}$. The arsenic peak is predicted to occur in 1,750 years. For the hazardous constituents in both Alternatives 1 and 2, the predicted aquifer concentrations all correspond to noncarcinogenic hazard quotients less than one. Therefore, none of the noncarcinogenic metals are predicted to have future aquifer concentrations that pose an unacceptable risk to human health or the environment.

A conservative approach has been taken for the Pu-239 concentration predictions. The Pu-239 vadose zone transport model used parameter values chosen to predict transport through the vadose zone that is much faster than is expected.

4.1.8 Waste Management

Both Alternatives 1 and 2 would generate asbestos-contaminated waste from the siding, roofing, and piping insulation. The fuel racks, contaminated building structure, water treatment vessels, and personal protective equipment would make up the low-level waste and the mixed waste would include the basin sludge, VES-SFE-106 sludge, and the waste beds from the water treatment vessels that would be generated from Alternatives 1 and 3. The alternatives would generate industrial waste (the clean building steel structure, I-beams and equipment) liquid waste (the water used to flush the water treatment tanks), and lead (the grating covering the north and middle basins and some fasteners). See Table 4 for amount of each waste stream for all the alternatives.

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a. NCRP (National Council on Radiation Protection), 1996, *Screening Models for Releases of Radionuclides to Atmosphere, Surface Water, and Groundwater, NCRP Report No. 123.*

Alternative 1 would decrease the amount of waste left in place, but would increase the amount of waste requiring disposal elsewhere. The industrial waste would be disposed of at the INEEL Landfill Complex and the mixed waste would be shipped off-Site. Low-level radioactive waste would be disposed of at an appropriate disposal facility designated by the INEEL to manage its low-level waste. Alternative 2 would generate the least amount of waste. Grouting in place would essentially encase all of the contents of the

Table 5. Summary of Post-Deactivation Impacts Across Alternatives. (Although, the proposed action is not specifically called out in the table, Alternatives 1, 2, and 3 bound the potential environmental consequences of the proposed action.)

Deactivation Impacts[a]	Alternative 1	Alternative 2	Alternative 3
Air Emissions	No Post-Deactivation Impacts	No Post-Deactivation Impacts	No Post-Deactivation Impacts
Geology			
Soil	None	None	None
Seismic (risk value)	About 10^{-6}	About 10^{-6}	None
Subsidence	None	None	None
Water Resources			
Flooding Risk	10^{-6} to 10^{-8}	10^{-6} to 10^{-8}	None
Groundwater	See Health Effects	See Health Effects	None
Biological Resources	None	None	Potential return of 0.6 ac. Natural Productivity
Cultural Resources (Historical & Archaeological)	None Expected	None Expected	None Expected
Land Use	Long-term Restriction on Use <2% of INEEL Area	Long-term Restriction on Use <2% of INEEL Area	May be long-term positive benefits with return of land
Visual Resources	1 to 5-ft Grouted Block Left In-Place	5 to10-ft Grouted Block Left In-Place	None
Health Effects			
Airborne	None	None	None
Groundwater (mrem)	$1x10^{-6}$	$1x10^{-5}$	None
External Exposure	None	None	None
Waste Management	Long-term S&M	Long-term S&M	Waste management and/or monitoring at other disposal locations.

CPP-603A facility, excluding the waste streams identified in Table 4 in a solid grout block. The total estimated encased volume of the complex and its contents for Alternative 2 is 562,065 ft^3.

Alternative 3 would remove and treat highly radioactive residue during the decontamination process. Fixed radioactive material would remain on the excavated walls, floors, and equipment. Removal activities may result in the release of contamination, due to the large amount of work required to demolish the buildings. Removal activities such as decontamination and treatment may result in additional air emissions and additional emissions may occur during treatment of the waste streams removed from the facilities. DOE would not fully characterize the physical parameters, chemical composition, and radiological attributes of the specific waste streams until D&D activities begin. Although uncertainties exist regarding the specific character of the materials, waste treatment, disposal plans, and emissions from treatments, DOE has the capabilities and expertise available to manage the waste in a safe, regulatory compliant manner. Detailed waste characterization would be performed to determine how best to dispose of the waste.

4.2 No Action Alternative

4.2.1 Continue Ongoing Operations

The CPP-603A facility does not have a current mission, nor are any missions foreseen which would allow the building to be used. Modifying the facility for another use is not practical for several reasons. The CPP-603A facility was designed and built for specific fuel receipt and storage purposes and it is highly radioactive. The cost to modify the facility is prohibitive. In addition, DOE would have to upgrade the facility to meet current building and environmental codes and standards.

Because the building is over 40 years old, S&M costs would increase over time. There is already a concern associated with leaking roofs and walls, equipment leaking, and materials such as asbestos insulation falling off into the building. Finally, it would eventually become necessary to deactivate the facilities. This would occur when DOE ultimately closes INTEC. The seismic risk at INTEC, of 10^{-6} would continue to apply to the facility as long as the facility remained.

Therefore, the Continue Ongoing Operations alternative would consist of the present S&M activities at the facility. DOE currently spends about $1-2M a year on S&M to maintain heat and operate the systems within the building. These costs would rise as it becomes more difficult to maintain the facility as it ages. In addition, the cost of compliance may increase, as potential contamination problems increase, with the aging of the facility.

4.2.2 Discontinue Ongoing Operations

Failure to continue S&M activities at the CPP-603A facility would result in deterioration of buildings and potential release of radioactive and hazardous substances to the environment. Fugitive air emissions would occur as the buildings deteriorate. Deteriorating buildings could also allow the movement of animals, such as mice, in and out of the buildings, thus creating a potential biological pathway for radiation and toxic exposure. Storm water infiltration and drainage may occur as the roof, floor, and walls deteriorate, resulting in potential soil and groundwater contamination. In addition, the lack of maintenance of the structure would result in deterioration of a structure that is eligible for nomination to the National Register of Historic Places. Additional potential impacts could include radioactive emissions as water evaporates and the ring of contamination in the basins becomes exposed and mobile. Worker exposure would decrease. Waste generation and the transportation risk associated with Alternatives 1 and 3 would be eliminated.

DOE may eventually deactivate the facility when INTEC closes. However, the difficulties associated with the deactivation would increase with time. Escalation and the increasing deterioration of the facility would ultimately result in an increase in cost and increased risk of release of contaminated materials. In addition, it is likely that the discontinuation of "ongoing operations" would violate environmental laws and regulations, such as RCRA, and endanger the health and safety of workers and the public.

4.3 Cumulative Impacts

A cumulative impact results from the incremental impacts associated with implementing an alternative plus the impacts of other past, present, and reasonably foreseeable future actions. The previous sections discuss the incremental impacts of the alternative actions related to decontaminating and decommissioning CPP-603A. The following sections discuss the potential cumulative impacts and risks associated with the alternative actions, including the No Action Alternative. In addition to the discussions below, the SNF & INEL FEIS evaluates the cumulative impacts of alternatives plus the impacts of other past, present, and reasonably foreseeable future actions. "Other" actions include DOE projects at the potentially affected sites not related to SNF management such as those activities occurring in CPP-603A. In the case of the SNF & INEL FEIS, the selected alternative, Alternative B, includes the incremental impacts associated with the D&D of CPP-603A. The SNF & INEL FEIS found that on "a nationwide basis, the implementation of any of the SNF management alternatives would not significantly contribute to cumulative impacts." However, the evaluation in the SNF & INEL FEIS does not include a detailed assessment of the potential incremental impacts and risks, as does this EA, associated with decontaminating and dismantlement of the CPP-603A facility. In addition, the Idaho High-Level Waste EIS analyzes the facility disposition of all high-level waste facilities, however it does not include the CPP-603 Facility.

This EA finds that based on the incremental impacts and associated health risks, described under Alternative 1, would contribute a negligible amount to the overall cumulative risk at INTEC. Nevertheless, DOE would evaluate this risk further as part of the INTEC Composite Analysis. The sections below discuss the incremental impacts and risks that contribute to the cumulative impacts and risks discussed in the SNF & INEL FEIS and that will be part of an INTEC Composite Analysis.

4.3.1 Air Resources

Table 6 shows the radiological effects from current and future INEEL operational releases (DOE 1995a{ TA \s "DOE 1995a" } and 1995b{ TA \s "DOE 1995b" }) on the worker, MEI, and the population within 50 miles of the INEEL. For the alternatives, the risk to an INEEL worker from airborne radionuclide emissions would cause an estimated increased lifetime chance of developing fatal cancer of less than 1 in 29,000. The increased dose to the MEI from any of the alternatives is low and would result in a fatal cancer risk to the MEI of less than 1 in 26,000,000. A one-year cumulative dose from existing and

Table 6. Radiological Dose and Cancer Risk from INEEL Baseline, Waste Calcine Facility, and Alternatives 1, 2, & 3 of CPP-603A Demolition.

	INEEL Baseline[a]	WCF[b]	Alternative 1	CPP-603 Alternative 2	Alternative 3
			Dose		
Nearby Worker (mrem/yr)	3.2×10^0	1.4×10^{-7}	4.0×10^1	2.7×10^1	8.5×10^1
Off-site MEI (mrem/yr)	5.0×10^{-1}	1.5×10^{-9}	3.6×10^{-2}	2.5×10^{-2}	7.6×10^{-2}
Population within 50 miles (person-rem/yr)	3.0×10^0	2.5×10^{-8}	1.4×10^{-1}	9.6×10^{-2}	3.0×10^{-1}
			Cancer Risk		
Nearby Worker	1.3×10^{-6}	5.6×10^{-14}	1.6×10^{-5}	1.1×10^{-5}	3.4×10^{-5}
Off-site MEI	2.5×10^{-7}	7.5×10^{-16}	1.8×10^{-8}	1.2×10^{-8}	3.8×10^{-8}
Population within 50 miles	1.5×10^{-3}	1.3×10^{-11}	7.0×10^{-5}	4.8×10^{-5}	1.5×10^{-4}

a. FEIS, Volume 2, Table 5.12-1, p. 5.12-7 and Table 5.12-2, p. 5.12-8 (DOE 1995a)
b. DOE/EA-1149, Table 2, p. 24, (DOE 1996b{ TA \l "DOE (U. S. Department of Energy), 1996b, Environmental Assessment – Closure of the Waste Calcining Facility (CPP-633), Idaho National Engineering Laboratory DOE/EA-1149, July 1996." \s "DOE 1996b" \c 9 }).

planned INEEL operations would produce about 0.002 additional fatal cancers in the surrounding 50-mi radius population. For perspective, about 38 cancer deaths occur in the same population from all other sources each year, according to the NCI (1994{ TA \s "NCI 1994" }). Radiological releases resulting from Alternative 1, present INEEL operations, and other proposed future actions would not be expected to cause measurable adverse health effects to workers, the MEI, or the public.

4.3.2 Geology and Soil Resources

Individually, the grouted blocks created by either the Alternative 1 or 2, would not have a significant impact on groundwater quality. Modelers have shown that dose concentrations and cancer risks are low (McCarthy 2001{ TA \s "McCarthy 2001" }). Likewise, the grouted basin would not be subject to damage or releases by seismic or volcanic events as stated in Section 4.1.2. Probabilities of inundation of the area by basalt lava flows are in the range of 10^{-6} per year. Therefore, unless significant changes occur in climate (e.g., wetter, colder) that would increase the precipitation and water flow, cumulative impacts are not expected to affect the geology (or soil) of the INEEL.

4.3.3 Surface Water and Groundwater Resources

DOE does not expect any additive incremental impact to surface water flows from this or other similar deactivation projects. In addition, it is unlikely that any damage to the grout encased buildings or leakage of radionuclide or hazardous chemicals would occur as a result of floods (see Section 4.1.3). Rainwater and snowmelt are common vehicles to convey contaminants to the groundwater. Effective storm water pollution prevention measures (see Table 2) would prevent potential cumulative impacts to surface water and the potential for the deactivated facilities to contaminate groundwater.
The potential cumulative effects on aquifer quality were evaluated for Alternatives 1 and 2. As explained in Section 2.2, for Alternative 1, at least 90% of the sludge (and therefore radionuclide inventory) would be removed from the basins. For Alternative 2, all of the sludge in the basins would be left in place. Because Alternative 1 has only $1/10^{th}$ the radionuclide inventory of Alternative 2, the resulting predicted cumulative peak aquifer risk for Alternative 1 is only $1/10^{th}$ the predicted cumulative peak aquifer risk for Alternative 2. The predicted cumulative peak risks for Alternative 1 and 2 are described below.

A potentially significant contributor to the cumulative effects on aquifer quality was conservatively defined to be a contaminant with a predicted peak aquifer concentration greater than the 10^{-7} risk or hazard quotient equal to 0.1 based concentration.

For Alternative 1, Pu-239 is the only contaminant that was predicted to have a peak aquifer concentration equal to or greater than the $1x10^{-6}$ risk based concentration. The Pu-239 predicted peak aquifer concentration is 0.2 pCi/L, which is equivalent to a $1x10^{-6}$ risk. Screening level conservative Kd values were used for the vadose zone and aquifer Pu-239 transport. Therefore, this is expected to be a conservative prediction. In addition to Pu-239, arsenic ($2x10^{-7}$ risk) was the only contaminant defined as a potentially significant contributor to the cumulative effects on aquifer quality. Because the arsenic peak aquifer predicted to be in 1,750 years, and the Pu-239 peak is predicted to be in 20,000 years, there would be no significant cumulative effect of arsenic and Pu-239 concentrations in the aquifer.

The predicted vadose zone pore water concentrations are compared with the MCLs. For Alternative 1, Pu-239, cadmium, and chromium were predicted to have vadose zone pore water concentrations greater than the MCL. The predicted vadose zone pore water concentrations were predicted to be 2.3, 2.2, and 1.6 times the MCLs for Pu-239, cadmium, and chromium, respectfully. Dilution in the aquifer is expected to be a factor of approximately 180.

For Alternative 2, arsenic and Pu-239 are the only contaminants that were predicted to have peak aquifer concentrations equal to or greater than the $1x10^{-6}$ risk based limiting concentrations. For arsenic, the predicted peak aquifer concentration is $1x10^{-4}$ mg/L, which is equivalent to a $2x10^{-6}$ risk. For Pu-239, the predicted peak aquifer concentration is 2 pCi/L, which is equivalent to a $1x10^{-5}$ risk. Again, the Pu-239 prediction is conservative because the soil Kd value used for plutonium (22 mL/g) is a conservative, screening level Kd for this environment. In addition to Pu-239 and arsenic, Nb-94 ($6x10^{-7}$ risk), U-234 ($6x10^{-7}$ risk), and U-235 ($2.5x10^{-7}$ risk) are defined as potentially significant contributors to the cumulative effects on aquifer quality. However, because the peak aquifer concentrations are predicted to be in 1,750 years for arsenic, 8,500 years for the uraniums, 9,200 years for Nb-94, and 20,000 years for Pu-239, only the uraniums and Nb-94 could have a significant cumulative effect. Assuming simultaneous peak aquifer concentrations of U-234, U-235, and Nb-94, the cumulative groundwater risk in approximately 9,000 years would be $1.5x10^{-6}$.

For Alternative 2, the predicted vadose zone pore water concentrations are compared to the MCLs. Pu-239, aluminum, cadmium, chromium, lead, and total uranium were predicted to have vadose zone pore water concentrations greater than the MCLs. A concentration dilution of 23 in the aquifer would be sufficient to assure that the aquifer concentrations for all the contaminants would be below the MCLs.

In summary, the maximum cumulative risk predicted for Alternative 1 is $1x10^{-6}$ (1 in a million) and would occur in approximately 20,000 years. The maximum cumulative risk predicted for Alternative 2 is $1x10^{-5}$ (1 in 100,000) and would occur in approximately 20,000 years. Additional cumulative risk greater than $1x10^{-6}$ is predicted for Alternative 2 from a combination of U-234, U-235, and Nb-94. This cumulative risk would reach a maximum of $1.5x10^{-6}$ (1.5 in a million) in about 9,000 years.

4.3.4 Biological Resources

In all the alternatives, the likely long-term impacts to biota range from neutral to potentially positive. It can be assumed cumulative impacts of any of the alternatives, including the No Action Alternative, would not likely have a harmful effect on individual threatened or endangered species, or on populations of species of special concern.

4.3.5 Cultural Resources

All undertakings on the INEEL have the potential to impact properties eligible for nomination to the National Register of Historic Places. In many instances, particularly in the case of archaeological resources, these impacts are avoidable through slight changes in project plans and implementation of standard practices. When historic structures are involved, it is more difficult to avoid direct impacts. Impacts are adverse if the undertaking destroys or substantially alters structures or portions of these structures that make them eligible for nomination (see Section 4.1.5). The undertakings from the Alternative 1, resulting in adverse impacts to historic INEEL properties and/or archaeological sites, would proceed only in accordance with all of the substantive requirements resulting from consultation among DOE-ID, the Idaho SHPO, ACHP and other interested parties as outlined in a MOA signed by DOE, Idaho SHPO and ACHP in 1998 and/or as outlined in an archaeological site treatment plan. DOE does not expect cumulative impacts to the cultural resources of the INEEL from any of the alternatives.

4.3.6 Land Use and Visual Resources

Current development uses only about 2% of INEEL land. Even if all the facilities on the INEEL were deactivated and grouted in place, the cumulative impact to land resources would be small (about 11,000 acres of a total 569,295 acres).

4.3.7 Health Affects

Based on the incremental impacts and associated health risks Alternative 1 would contribute a negligible amount to the overall cumulative risk at INTEC. For instance, health risks are at or below the NCP level of 10^{-6} (see Section 4.1.7). However, residual contamination left in CPP-603A at the completion of deactivation and associated health affects would be evaluated as part of the INTEC Composite Analysis that would be prepared to comply with DOE Order 435.1. The INTEC Composite Analysis evaluation will assess the contribution of any residual waste remaining at INTEC, including any remaining in CPP-603A.

4.3.8 Waste Management

The alternatives generate waste streams that require management and disposal. The amount of waste would be typical of most D&D actions at the INEEL. Although, the Idaho High-Level Waste & Facilities Disposition Draft EIS does not specifically address the CPP-603A project, it does provide a summary of waste types and quantities generated at the INEEL. This EIS states the annual generation of low-level waste is 6,400m^3, mixed waste is 230m^3 and industrial waste is 52,000m^3. Alternative 1 would generate 4,729m^3 of low-level waste, 85m^3 of mixed waste, and 428m^3 of industrial waste over the life of the project. The 85m^3 of mixed waste includes the dewatered sludge before treatment. The sludge would be treated to render it non-hazardous under RCRA. The final volume of low-level waste would be determined as the detailed treatment process is finalized. DOE does not consider the quantity or the management of these waste streams to have an impact to INEEL waste management operations.

5. PERMIT AND REGULATORY REQUIREMENTS

5.1 Federal Government

Section 106 of the National Historic Preservation Act of 1966, as amended, requires agencies to consider the impact of undertakings on properties listed or eligible for listing in the National Register of Historic Places and to consult with the Idaho SHPO and other interested parties when impacts are likely. Section 110 directs federal agencies to establish programs to find, evaluate and nominate eligible properties to the National Register of Historic Places, including previously unidentified historic properties that may be discovered during the implementation of a project (36 CFR Part 800). In addition, the Archaeological Resources Protection Act of 1979, as amended, provides for the protection and management of archaeological resources on federal lands.

DOE is required to review as guidance the most current USFWS list for threatened and endangered (T&E{ TA \l "T&E###threatened and endangered (as in T&E species)" \s "T&E" \c 8 }) plant and animal species. If, after reviewing the list, DOE determines that Alternative 1 would not impact any T&E species, DOE may determine or document that formal consultation with the USFWS is not required for this action. DOE has determined that a biological assessment would not be required for any of the alternatives.

Before demolition activities of CPP-603A are initiated, a SWPPP-CA would be prepared and approved for project activities in accordance with the INEEL SWPPP-CA (DOE 1993{ TA \l "DOE (U. S. Department of Energy), 1993, *INEL Stormwater Pollution Prevention Plan for Construction Activities*, DOE/ID-10425, February 1993." \s "DOE 1993" \c 9 }). During construction and operation phases, erosion prevention and sediment controls would be implemented according to best management practices from EPA's Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices (EPA 1992{ TA \l "EPA (U. S. Environmental Protection Agency), 1992, *Storm Water Management for construction Activities – Developing Pollution Protection Plans and Best Management Practices*, EPA 832-R-92-005, Office of Wastewater Enforcement and Compliance, Washington, D.C." \s "EPA 1992" \c 9 }).

5.2 State and Local

The VES-SFE-106 (Radioactive Solids and Liquid Waste Storage Vessel) Tank System under interim status would be closed in accordance with RCRA requirements. As discussed previously, a conservative assumption has been made that the basin water treatment system identified in the VCO is ancillary to VES-SFE-106 and would be closed to the same performance standard. However, should this assumption prove to be incorrect, it may be necessary to close the interim status unit and the VCO units at different times in compliance with separate closure plans. DOE is preparing a RCRA closure plan to describe in detail how closure of the entire tank system would occur. In the event that this closure approach becomes impractical, a separate plan addressing the individual requirements would be prepared and submitted to the Idaho DEQ. The Idaho DEQ must review and approve the plan(s) before initiation of closure activities.

The State of Idaho regulates facilities called – Treatment, Storage, and Disposal Facilities –, that treat, store, or dispose of hazardous wastes. The EPA authorizes the State of Idaho to enforce RCRA regulations. The state oversees the management of hazardous waste through IDAPA. The State of Idaho HWMA requires that interim status or permitted units determined as no longer needed must undergo closure. Consequently, the proposed HWMA/RCRA closures must comply with Idaho Rules and Standards for Hazardous Waste, contained in IDAPA Section 58.01.05.

The VCO was signed by DOE and the Idaho DEQ and became effective on June 14, 2000. The VCO covers several matters where the INEEL is potentially not in regulatory compliance with RCRA. For each covered matter, the issue description, action summary, and milestones have been discussed with the Idaho DEQ to identify an acceptable path forward to bring the matter into regulatory compliance.

The calculated estimate for the total basin sludge currently in the CPP-603A basins is approximately 130,000 Kg. Under the proposed scenario to remove the sludge from the CPP-603A basins, the sludge would become mixed waste when it is removed from the basins and sufficient water is removed to concentrate the metals to a point that they exceed the limits described at 40 CFR 261.24 of RCRA. Under the proposed treatment train, the initial solids/water separation step would occur in a hydrocyclone unit.

RCRA allows the generator of waste to treat mixed waste in a tank or a container without requiring a permit if the generator meets specific requirements under 40 CFR 268.7(a)(5) and 262.34. The proposed treatment train would move the now mixed waste solids from the hydrocyclone into dewatering casks where additional water would be removed with the addition of a flocculent to settle the solids out of the suspension. As the final step in the treatment train, cement (or a similar material) would be added to the cask and mixed with the suspension to solidify the sludge. By design, this step would treat the solids to render them non-hazardous for characteristic toxic metals.

A 90-day period is stipulated by RCRA from the point where the sludge becomes mixed waste and the first volume of waste is placed in the container (in this case, the cask) and to the point when the waste is made non-hazardous by treatment. In the case of the CPP-603A basin sludge, this 90-day period would be applicable to the "batch" of waste generated in the hydrocyclone until it is rendered non-hazardous by treatment in a cask.

In compliance with the National Historic Preservation Act and its implementing regulations (36 CFR 800), all cultural resource evaluations and recommendations are subject to review by the Idaho SHPO. DOE-ID's "Working Agreement" with the Shoshone-Bannock Tribes also mandates consultation on cultural resource issues.

6. COORDINATION AND CONSULTATION

DOE is required to review as guidance the most current USFWS list for T&E plant and animal species. DOE determined that Alternative 1 would not impact any T&E species, and also determined that formal consultation with the USFWS is not required for this action.

DOE has consulted with the Idaho SHPO, ACHP, and other interested parties before the commencement of any activities associated with any of the alternatives as required by Section 106 of the National Historic Preservation Act. DOE-ID regularly consults with the Shoshone-Bannock Tribes under the "Working Agreement/Agreement in Principle." For draft EAs concerning proposed actions that may affect the Tribes, the state of Idaho, or the public, DOE-ID offers a 30-day comment period.

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GLOSSARY

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Alternatives. The range of reasonalbe options, including the No Action alternative, considered in selecting an approach to meeting the proposed objectives.. 1

Clean Air Act. Enacted in 1967 by congress, an act focused on regulation of ambient air quality to protect public health and welfare. Originally a set of principles to guide states in controlling sources of air pollution (the 1967 Air Quality Act), and evolving through a series of amendments (1970, 1977, and 1999 Clean Air Act Amendments) into a lengthy series of specific control requirements that the federal government must implement and statues, in large measure, must administer.. 15

Composite Analysis. An analysis that accounts for all sources of radioactive material that may contribute to the long-term dose projected to a hypothetical member of the public from an active or planned low-level waste disposal facility. The analysis is a planning tool intended to provide a reasonable expectation that current low-level waste disposal activities will not result in the need for future corrective or remedial actions to ensure protection of the public and the environment. (Adapted from Revised Interim DOE Policy on Management Direction and Oversight of Low-Level Radioactive Waste Management Disposal).. 5

Comprehensive Environmental Response, Compensation, and Liability Act. CERLCA provides funding and enforcement authority for cleaning up hazardous waste sites created in the past and for responding to hazardous substance spills.. 2

D&D Report. This report formally documents an overview of project activities, accomplishments, final facility or site status, and lessons learned. Prerequisites include the D&D project cleanup and disposal activities, independent verification of the project final status, and waste disposal actions have been completed. 7

Decommissioning. The process of removing a facility from operation (deactivation), followed by decontamination, entombment, dismantlement, or conversion to another use.. 1

Environmental Assessment. A concise public document that a Federal agency prepares under the NEPA to provide sufficient evidence and analysis to determine whether a proposed agency action would require preparation of an EIS or a FONSI. A Federal agency may also prepare an EA to aid its compliance with NEPA when no EIS is necessary or to facilitate preparation of an EIS when one is necessary. An EA must include brief discussions of the need for the proposal, alternatives, environmental impacts of the proposed actions and alternatives, and a list of agencies and persons consulted.. 1

Environmental Impact Statement. A detailed environmental analysis ofor a proposed major Federal action that could significantly affect the qualityof the human environment. A tool to assist in decisionmaking, it describes the positive and negative environmental effects of the proposed action and alternatives.. 1

Finding of No Significant Impact. A document, based on an EA by a federal agency briefly presenting the reasons why an action will not have a significant effect on the human environment and for which an EIS will therefore not be prepared.. 1

Hazardous Waste Management Act. Idaho Hazardous Waste Management Act, IDAPA 16.01.05, *Rules and Standards for Hazardous Waste* are the rules adopted pursuant to the authority vested in the Board of Health and Welfare by the Hazardous Waste Management Act of 1983, Sections 39-4401 et seq., Idaho Code. Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities, IDAPA 16.01.005.009, incorporate by reference 40 CFR Part 265, and all Subparts (excluding Subpart R and 40 CFR Parts 265.149 and 265.150) revised as of July 1,1994. (4-26-95).. 5

High Blow Counts. Blow counts are the number of blows of a 140-pound hammer falling 4 feet required to drive a split spoon sampler one foot into a soil or sediment. Obviously the higher the blow count the more unyielding the sediment or soil. 24

Idaho Settlement Agreement. In October 1995, the State of Idaho, the Department of the Navy, and DOE settled the cases of Public Service Co. of Colorado v. Batt, No. CV-91-0035-S-EJL (D. Id.) and

United States v. Batt, No. CV-91-0054-S-EJL (D. Id.). Under the Idaho Settlement Agreement, DOE is obligated to meet certain milestones involving the management and disposition of SNF and wastes at the INEEL). 11

Injection Wells. Wells into which fluids are injected for purposes such as waste disposal. 18

Interim Status. RCRA interim status facility Hazardous waste management facilities (that is, treatment, storage, or disposal facilities) subject to Resource Conservation and Recovery Act requirements that were in existence on the effective date of RCRA regulations are considered to have been issued a permit on an interim basis as long as they have met notification and permit application submission requirements. Such facilities are required to meet interim status standards until they have been issued a final permit or until their interim status is withdrawn. 5

Leachate. A product or solution formed by leaching, especially a solution containing contaminants picked up through the leaching of soil. 12

Maximumally Exposed Individual. A hypothetical individual defined to allow dose or dosage comparison with numerical criteria for the public. This individual is located at the point on the DOE site boundary nearest to the facility in question. 21

National Environmental Policy Act. A Federal law, enacted in 1970, that requires the Federal government to consider the environmental impacts of, and alternatives to, major proposed actions in its decisionmaking processes. Commonly referred to by its acronym, NEPA. 1

Percolation. The movement of water downward and radially through the sub-surface soil layers, usually continuing downward to the groundwater. 18

Perennial. A plant that lives three or more years. 18

Prevention of Significant Deterioration. Clean Air Act regulations designed to '*protect public health and welfare from any actual or potential adverse effect* . . .', U. S. Code, Title 42, The Public Health and Welfare, Chapter 85--Air Pollution Prevention and Control, Subchapter I--Programs and Activities, Part C--Prevention of Significant Deterioration of Air Quality. 15

Probable Maximum Flood. Hypothetical flood considered to be the most severe calculated flooding event possible. 16

Radiopharmaceuticals. A radioactive compound used in radiotherapy or diagnosis iii

Record of Decision. A public document that records the final decision(s) concerning a proposed action. The Record of Decision is based in whole or in part on information and technical analysis generated either during the Comprehensive Environmental Response, Compensation, and Liability Act) process or the NEPA process, both of which take into consideration public comments and community concerns. 1

Sagebrush-steppe. A large, relatively flat, treeless region that experience wide temperature changes, with sagebrush being the dominant vegetation characteristic. 18

Seismic. Of, subject to, or caused by an earthquake or earth vibration. 2

Shear Wave Velocity. Shear wave velocity equals the velocity at which shear waves travel through a rock or sediment or soil. The higher the velocity, the more elastic and strong the material is. 24

Source Terms. The type and quantity of pollutants emitted to air from a specific source or group of sources. 19

Spent Nuclear Fuel. Fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated. For the purposes of this EIS, spent nuclear fuel also includes uranium/neptunium target materials, blanket subassemblies, pieces of fuel, and debris..... 1

Standard Pratices. Those actions that avoid impacts altogether, minimize impacts, rectify impacts reduce or eliminate impacts, or compensate for the impact. In this case they are actions that are incorporated into the project design to minimize or eliminate potential impacts 5

Subsidence. Subsidence is a general geologic term for usually slow, sinking of the surface of the land. Subsidence occurs in a number of ways -- sinking of heavy structures into soft soil, groundwater withdrawal, collapse of underground cavities, or some tectonic process causing the crust of the earth to warp or bend downward. In geotechnical terminology, subsidence is usually not used. Instead, one of two terms are used - settlement or consolidation. Settlement always happens when building a heavy structure ion anything, including solid rock. It is instantaneous and depends on the elastic properties of the foundation material. This happens when you fill structures with concrete, but only usually an inch or less. Consolidation however is a serious concern because it is a long-term process, it can involve several inches to feet of downward movement, and it can occur differentially causing cracking of the structure. Geologists do not expect this to occur when filling ICPP structures with grout. 24

Threatened and Endangered Species. Any plants or animals that are likely to become endangered species 15

Undertakings. Undertakings refers to a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency including those carried out by or on behalf of an agency, those carried out with Federal financial assistance, those requiring a Federal permit, license, or approval, and those subject to State or local regulation administered pursuant to a delegation or approval by a Federal agency. 14

Voluntary Consent Order. The Voluntary Consent Order (VCO) was signed by DOE and the Idaho DEQ and became effective on June 14, 2000. The VCO covers several matters where the INEEL is potentially not in regulatory compliance with RCRA. For each covered matter, the issue description, action summary, and milestones have been discussed with the Idaho DEQ to identify an acceptable path forward to bring the matter into regulatory compliance. 5